REGISTRATIONS OF CULTIVARS

Registration of 'Tamrun OL01' Peanut

'Tamrun OL01' (Reg. no. CV-77, PI 631177) is a runner market-type peanut (*Arachis hypogaea* L. subsp. *hypogaea* var. *hypogaea*) cultivar with a high oleic (O) to low linoleic (L) fatty acid ratio and good yield potential. The new variety was tested as Tx977006 and was released by the Texas Agricultural Experiment Station in January 2002. A joint release with the Oklahoma Agricultural Experiment Station has also been approved and the same anticipated with the USDA-ARS.

Tamrun OL01 was derived as a single plant selection from a first backcross with 'Tamrun 96' (Smith et al., 1997) as the recurrent parent and 'SunOleic 95R' (Gorbet and Knauft, 1997), the donor of the high O/L genes. The first cross was made in 1995 and the subsequent backcross in 1996. The BC_1F_1 was field planted in 1996. The BC_1F_2 populations were spaced planted in the Puerto Rico winter nursery in the 1996-1997 season. Individual plants were harvested and planted as $BC_1F_{2:3}$ progeny rows in a TSWV screening nursery in 1997. Selections from these rows were made on the basis of disease ratings and agronomic traits. These selections were subjected to the first O/L analysis and the agronomically acceptable, elevated O/L lines were grown the following year in two preliminary $F_{2:4}$ yield trials. These were reselected on the basis of disease ratings, yield, and grade characteristics. Seed from these tests were reanalyzed for O/L ratio in 1998. From a subsequent yield test in 1999, $BC_1F_{2:5}$ seed were again tested for O/L ratio, and seeds testing high O/L were bulked and planted as $BC_1F_{2:6}$ Breeder seed increase. The released material was $BC_1F_{2:7}$.

Tamrun OL01 has plant size equal to Tamrun 96. The main stem is semiapparent at most locations and seeding rates. The lateral branching is profuse, similar to Tamrun 96, and the branching pattern is mostly alternate. Leaf color is medium green, also similar to Tamrun 96 (RHS 137A). Pods of Tamrun OL01 are much larger in size than Tamrun 96, mostly two seeded (up to 1% three seeded pods). Pod constriction between the seeds is moderate, but deeper than Tamrun 96. Seed size is also much larger than Tamrun 96, averaging 73 g 100 sd^{-1} over all locations.

In 18 tests from 1998 to 2000, Tamrun OL01 averaged 16% higher yield than 'Florunner' (Norden et al., 1969) in central Texas, west Texas, and southwest Oklahoma. Total sound mature kernels (TSMK) were found to be equal between Tamrun OL01 and Florunner in these tests (71.4 vs. 71.8%). However, 100 seed weights were significantly different (Tamrun OL01 = 73.3 g vs. Florunner = 59.8 g.). In shelling tests, Tamrun OL01 was significantly different ($P < 0.05$) from Florunner in jumbo, medium, and no. 1 seed size distribution. Splits, other kernels, damage kernels and oil stock were equal to Florunner.

Quality analyses indicated significant differences between Tamrun OL01 vs. Florunner and Tamrun 96, including such traits as O/L ratio = 13.0:1 vs. 1.6:1 and 1.7:1, iodine number = 81.3 vs. 100.1 and 98.3, oil content = 43.7 vs. 46.2 and 44.3% (ns), respectively. However, protein content, flavor, and blanchability were similar for Tamrun OL01, Florunner, and Tamrun 96.

Disease ratings in Texas and Oklahoma indicate that Tamrun OL01 has a moderate level of the same disease tolerant attributes as Tamrun 96 for *Tomato spotted wilt virus* (TSWV), stem rot or southern blight (caused by *Sclerotium rolfsii* Sacc.), and Sclerotinia blight (caused by *Sclerotinia minor* Jagger).

Foundation seed of Tamrun OL01 will be maintained by Foundation Seed Service, Texas Agric. Exp. Stn., Texas A&M Univ. Agric. Res. and Ext. Ctr., Vernon, TX 76384. Application (PVP no. 200200150) has been made for U.S. Plant Variety Protection. The cultivar must be sold as a class of Certified seed, by cultivar name only. Small samples of seed for research purposes may be obtained from the corresponding author for a period of 5 yr.

C.E. Simpson,* M.R. Baring, A.M. Schubert, H.A. Melouk, M.C. Black, Y. Lopez, and K.A. Keim

Acknowledgments

Appreciation is expressed to the Texas Peanut Producers Board and the Oklahoma Peanut Commission for their support of this research. The Tamrun OL01 cultivar was developed and released under a license agreement between the University of Florida Research Foundation and The Texas Agricultural Experiment Station.

References

Gorbet, D.W., and D.A. Knauft. 1997. Registration of 'SunOleic 95R' Peanut. Crop Sci. 37:1392.
Norden, A.J., R.W. Lipscomb, and W.A. Carver. 1969. Registration of 'Florunner' peanuts. Crop Sci. 9:850.
Smith, O.D., C.E. Simpson, M.C. Black, and B.A. Besler. 1997. Registration of 'Tamrun 96' Peanut. Crop Sci. 38:1403.

C.E. Simpson, Texas Agric. Exp. Stn., Stephenville, TX 76401; M.R. Baring, Soil & Crop Sci. Dep., Texas Agric. Exp Stn., Texas A&M Univ. College Station, TX 77843; A.M. Schubert, Texas Agric. Exp. Stn., Lubbock, 79403; H.A. Melouk, USDA-ARS, Stillwater, OK 74074; M.C. Black, Texas Coop. Ext., Texas Agric. Res. & Ext. Ctr., Uvalde, TX 78802; Y. Lopez, Texas Agric. Exp. Stn., Lubbock TX 79403; K.A. Keim, Oklahoma State Univ., Stillwater OK. 74074. Registration by CSSA. Accepted 31 March 2003. *Corresponding author (c-simpson@tamu.edu).

Published in Crop Sci. 43:2298 (2003).

Registration of 'Ok101' Wheat

'Ok101' (Reg. no. CV-932, PI 631493) is a hard red winter wheat (*Triticum aestivum* L.) developed cooperatively by the Oklahoma Agricultural Experiment Station and the USDA-ARS, and released in March 2001. Ok101 was released for its high tolerance to acidic soil, broad adaptation to both dual-purpose (graze-plus-grain production) and grain-only management systems, and resistance to *Wheat soilborne mosaic virus*. Its range of adaptation extends throughout Oklahoma, where it is best suited for irrigated production systems in the High Plains and dryland or irrigated production systems in central areas of Oklahoma and neighboring states.

Ok101 is a F_3–derived line with the pedigree OK88W663/'Mesa' (PI511308)//'2180' (PI532912). OK88W663 is a backcross-derived line from 'Chisholm' (Smith et al., 1985) with the pedigree Chisholm*3/3/'Newton'/'Largo'//2*Chisholm. Though Largo was used to introduce resistance to greenbug (*Schizaphis graminum* Rondani), resistance was not retained in Ok101. Ok101 traces to the bulk progeny of a single $F_{3:4}$ head row harvested in 1993. Subsequent generations were advanced by bulk selfing in the field, with occasional rouging of taller variants. Ok101 was evaluated as OK95571 in replicated Oklahoma performance trials from 1995 to 2000, in the Southern Regional Performance Nursery in 1998 and 1999, and in the Hard Winter Wheat Milling and Baking Evaluation Program of the Wheat Quality Council in 1998 and 1999.

Plant stature, heading date, and straw strength of Ok101 are intermediate compared with other currently grown semidwarf cultivars. In Oklahoma, the height of Ok101 and '2174' averaged 87 cm versus 86 cm for 'Jagger' and 'Custer', and 89 cm for '2137'. Heading date of Ok101 (119 d) is 1 d later than Jagger and Custer, the same as 2174, and 2 d earlier than 2137. Lodging resistance on a scale of 1 (highly resistant) to 5 (susceptible) is about 3, slightly superior to Jagger (4) but inferior to 2174 (1) and 2137 (1). Ok101 is highly tolerant to soil acidity and aluminum toxicity. Under field conditions at a soil pH of 4.0 to 4.2 and Al saturation of 30%, Ok101 has a tolerance rating of 1.7 on a scale of 1 (most tolerant) to 5 (susceptible), compared with 3.9 for Custer, 3.1 for 2174, 2.2 for Jagger, and 1.7 for 2137.

Ok101 shows no post-harvest seed dormancy under growth-chamber conditions at 24 to 35°C, a relatively short coleoptile (5.9 cm, 63% of 'Scout 66'), a semiprostrate growth habit in the fall, and an intermediate to moderately early dormancy release during the winter. Ok101 reaches the first-hollow-stem stage at the same time as Custer, or about 7 d later than Jagger and 6 d earlier than 2174. Fall forage production has averaged 2710 (Ok101), 2790 (2174), 2770 (Jagger), and 2550 (Custer) kg ha^{-1} in replicated Oklahoma variety trials during 2001 and 2002. With early planting, Ok101 has shown rapid emergence and excellent recovery from forage removal through early March in north central Oklahoma. Its high forage capability and grain yield potential following grazing make Ok101 well suited for a graze-plus-grain management system in the central areas of the southern Great Plains.

Flag leaves of Ok101 at the booting stage are light green, erect, and twisted at the tip. Ok101 is white-chaffed and moderately tolerant to shattering (intermediate to Jagger and 2174), with awned, tapering, middense spikes that are inclined to nodding at maturity. Kernels are red, hard textured, ovate to elliptical, and midlong, and they have a midwide, shallow crease, rounded cheeks, and midsized germ.

In greenhouse tests, juvenile plants of Ok101 exhibited a susceptible reaction to leaf rust (caused by *Puccinia triticina* Eriks.) on the basis of a bulk sample of urediniospores collected from wheat fields in Oklahoma in 1999. In 2002, adult plants showed a moderately susceptible reaction to leaf rust in the field in Texas and Oklahoma, or an approximate rating of 5 on a 1-to-9 scale. On the basis of tests conducted by the USDA-ARS Cereal Disease Laboratory, St. Paul, MN, Ok101 is postulated to carry *Lr*3 plus other unnamed genes, and it is postulated to carry *Sr*17 for resistance to stem rust (caused by *Puccinia graminis* Pers.:Pers. f. sp. tritici Eriks. and E. Henn). On the basis of adult-plant field reactions in 2000 and 2001, Ok101 is susceptible to stripe rust (caused by *Puccinia striiformis* Westend). Visual ratings of reaction to *Wheat soil-borne mosaic virus* generally indicate resistance (1 on a 1-to-9 scale) in Oklahoma. On the basis of seedling tests in the greenhouse, Ok101 is moderately susceptible to tan spot [caused by *Pyrenophora tritici-repentis* (Died.) Drechs.], and it is susceptible to powdery mildew [caused by *Blumeria graminis* (DC.) E.O. Speer f. sp. *tritici* Em. Marchal]. Ok101 is moderately susceptible to *Wheat streak mosaic virus*, *Barley yellow dwarf virus*, and Septoria leaf blotch (caused by *Septoria tritici* Roberge in Desmaz). Insect reactions include a heterogeneous response to the Great Plains biotype of Hessian fly (*Mayetiola destructor* Say) and susceptibility to Russian wheat aphid (*Diuraphis noxia* Mordvilko) and to greenbug.

Ok101 was evaluated for grain yield in replicated variety trials in Oklahoma from 2000 through 2002. Across 62 site-years representing mostly grain-only trials, Ok101 averaged 3040 kg ha^{-1}. Grain yields of other currently grown cultivars were similar at 2980 kg ha^{-1} (Custer), 3000 kg ha^{-1} (2174), and 3070 kg ha^{-1} (Jagger). In the same trials, the grain volume weight of Ok101 (740 kg m^{-3}) was lower than Custer (750 kg m^{-3}) and 2174 (759 kg m^{-3}), but similar to Jagger (739 kg m^{-3}).

On the basis of single-kernel characterization system data recorded from nine breeder trials in 1999 and 2000, Ok101 has large and consistent kernel size. Means and standard deviations were 30.9 and 6.8 mg for kernel weight, 2.4 and 0.5 mm for kernel diameter, and 56 and 17 for kernel hardness. From 17 site-years in the 2001 and 2002 Oklahoma variety trials, the grain protein content of Ok101 and 2137 averaged 117 g kg^{-1}, or 14 g kg^{-1} lower than 2174 and Jagger. Ok101 has medium dough mixing properties, with a typical mixing time of 5 min and a mixing tolerance score of 4 to 5 on 1-to-10 scale. Composite milling scores reported by the USDA-ARS from 1998 and 1999 SRPN sites carried ratings of good to very good in the southern Great Plains intraregional production zones. Baking scores were more variable, especially between years, spanning the full range of very poor to very good. Overall baking quality was considered acceptable for samples submitted to the Wheat Quality Council in 1998 and 1999, with scores ranging from 3.08 to 3.41 on a 0-to-6 scale. For the 1998 samples, Ok101 averaged 766 g kg^{-1} straight grade flour yield with 4.2 g kg^{-1} flour ash, compared with the check cultivar, 'Karl 92', which averaged 747 g kg^{-1} flour yield and 4.9 g kg^{-1} flour ash. For the 1999 samples, Ok101 averaged 771 g kg^{-1} straight grade flour yield with 4.3 g kg^{-1} flour ash, compared with the check cultivar, 2174, which averaged 766 g kg^{-1} flour yield and 5.0 g kg^{-1} flour ash.

Breeder seed of Ok101 will be maintained by the Dep. of Plant and Soil Sciences and the Oklahoma Agricultural Experiment Station, Oklahoma State University, Stillwater, OK 74078. Small quantities of seed may be obtained for breeding and research purposes from the corresponding author for 5 yr from the date of publication. Seed has also been deposited in the National Seed Storage Laboratory, Fort Collins, CO.

B.F. Carver,* E.L. Smith, E.G. Krenzer, R.M. Hunger, D.R. Porter, A.R. Klatt, J. Verchot-Lubicz, P. Rayas-Duarte, A.C. Guenzi, B.C. Martin, and G. Bai

References

Smith, E.L., O.G. Merkle, H.T. Nguyen, D.C. Abbott, and G.H. Morgan. 1985. Registration of 'Chisholm' wheat. Crop Sci. 25:367.

B.F. Carver, E.L. Smith (retired), E.G. Krenzer, A.R. Klatt, A.C. Guenzi, B.C. Martin, and G. Bai, Dep. of Plant and Soil Sciences, Oklahoma State Univ., Stillwater, OK 74078; R.M. Hunger and J. Verchot-Lubicz, Dep. of Entomology and Plant Pathology, Oklahoma State Univ., Stillwater, OK 74078; D.R. Porter, USDA-ARS Plant Science Res. Lab., Stillwater, OK 74075; P. Rayas-Duarte, Dep. of Biochemistry and Molecular Biology, Oklahoma State Univ., Stillwater, OK 74078. Ok101 was developed with partial financial support of the Oklahoma Wheat Res. Foundation and Oklahoma Wheat Commission. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (bfc@okstate.edu).

Published in Crop Sci. 43:2298–2299 (2003).

Registration of 'Tamcot Luxor' Cotton

'Tamcot Luxor' cotton (*Gossypium hirsutum* L.) (Reg. no. CV–119, PI 610194) was released in 1999 by the Texas Agricultural Experiment Station, Multi-Adversity Resistance (MAR) Genetic Improvement Program. Tamcot Luxor was bred as part of an ongoing effort to develop cultivars with improved resistance to biotic and abiotic stresses, combined with increased yield potential, early maturity, and enhanced fiber and seed quality.

Tamcot Luxor was developed by pedigree selection from the cross of the unreleased MAR breeding lines CABUCAHUGS-1-88 and CABUCAG8US-1-88. CABUCAHUGS-1-88 is from the cross of the unreleased breeding lines CABUCS-2-1-83 and CAHUGS-2-85. CABUCAG8US-1-88, an unreleased breeding line, originated from the cross between CABUCS-2-1-83 and an unreleased breeding line, CAG8-CHUNS-1-85. On the basis of visual selection for yield potential, bolls were bulked within an F_2 row for advance to the F_3 generation. Greenhouse grown F_3 plants were challenged with bacterial blight [caused by *Xanthomonas campestris* pv. *malvacearum* (Smith) Dye] by means of procedures outlined by Bird (1982) and El-Zik and Thaxton (1989). Resistant F_3 plants with most bolls were advanced to F_4. A resulting $F_{3:4}$ progeny row was selected on the basis of seed-cotton yield and fiber quality when compared with commercial checks in the field in 1991. Tamcot Luxor was derived from the bulk increase of a $F_{3:4}$ progeny row.

Tamcot Luxor is glanded, possesses normal shaped-leaves and bracts, has pubescent stems and leaves, and is nectaried. Tamcot Luxor has a cylindrical shaped growth habit, flowers with cream-colored pollen, and storm resistant bolls. On the basis of yield trials conducted at Corpus Christi, College Station, and Chillicothe, TX, in 1996 and 1997, height of Tamcot Luxor was similar to that of 'Tamcot Sphinx' (El-Zik and Thaxton, 1996) and 'Tamcot CAB-CS' (Bird et al., 1986). Tamcot Luxor is similar to Tamcot Sphinx in plant habit, and nodes and cm to first fruiting branch.

Tamcot Luxor was tested extensively throughout Texas and Oklahoma for resistance to several pathogens causing seed-seedling diseases (*Pythium ultimum* Trow, *Rhizoctonia solani* Kühn), bacterial blight, Phymatotrichum root rot (*Phymatotrichum omnivorum* Duggar), and Verticillium wilt (*Verticillium dahliae* Kleb.), agronomic characteristics, earliness, productivity, and fiber quality. Resistance of Tamcot Luxor to these pathogens is based on comparisons with reference genotypes with established reaction to the same pathogens.

On the basis of stand establishment in soils naturally infested with *P. ultimum* and *R. solani*, Tamcot Luxor has stand ability and seedling vigor similar to resistant cultivars Tamcot Sphinx, Tamcot HQ95 (El-Zik and Thaxton, 1990), and Tamcot CAB-CS, and 20% better stand ability than susceptible cv. Deltapine 50 (Calhoun et al., 1997). Tamcot Luxor has the $B_2B_3B_7$ genes that confer resistance to the 19 U.S. races of the bacterial blight pathogen (*Xcm*). Tamcot Luxor has resistance to Phymatotrichum root rot and Verticillium wilt equal to that of Tamcot Sphinx.

Tamcot Luxor has lint yield potential similar to Tamcot Sphinx, but produced 9% higher yield than that of Tamcot CAB-CS, 10% higher lint yield than Tamcot HQ95, and 20% higher lint yield than Deltapine 50 in 40 tests conducted from 1992 to 1997 at 8 to 12 locations. On the basis of percentage first pick yield, Tamcot Luxor is similar in maturity to Tamcot HQ95 and Tamcot CAB-CS, but averages 5 d earlier maturity than Tamcot Sphinx. Tamcot Luxor has 10% larger bolls than those of Tamcot Sphinx or Deltapine 50. Lint fractions of Tamcot Luxor average 1.2% higher than those of Tamcot Sphinx, and 3.8% higher than Deltapine 50. Fiber bundle strength measured by high volume instrument analysis was similar to Tamcot HQ95 and Deltapine 50, but was 18 kN m kg^{-1} higher than that of Tamcot CAB-CS. Micronaire readings of Tamcot Luxor average 0.2 units higher than those of Tamcot CAB-CS or Tamcot HQ95. The upper half mean fiber length of Tamcot Luxor was 0.8 mm shorter, fiber bundle strength 21 kN m kg^{-1} lower, and micronaire reading 0.4 units lower than those of Tamcot Sphinx.

Breeder seed of Tamcot Luxor will be maintained by the Texas Agricultural Experiment Station, College Station, TX 77843-2474. The Foundation Seed Service of the Texas Agricultural Experiment Station produces and sells Foundation seed to producers of Registered and Certified classes. Application has been made for cultivar protection under the U.S. Plant Variety Protection Act (Application no. 9900394) requiring that it be sold by cultivar name only as a class of Certified seed. Small quantities of seed for research purposes can be obtained from the corresponding author.

P.M. Thaxton* and K.M. El-Zik

Acknowledgments

Research leading to the development of Tamcot Luxor was supported in part by grants from the Texas Food and Fibers Commission and the Cotton Incorporated State Support Program. We thank the MAR Cotton Genetic Improvement Program staff, Texas Agric. Exp. Stn., and Cooperative Extension Service for testing Tamcot Luxor.

References

Bird, L.S. 1982. The MAR (multi-adversity resistance) system for genetic improvement of cotton. Plant Dis. 66:172–176.

Bird, L.S., K.M. El-Zik, and P.M. Thaxton. 1986. Registration of 'Tamcot CAB-CS' upland cotton. Crop Sci. 26:384–385.

Calhoun, D.S., D.T. Bowman, and O.L. May. 1997. Pedigrees of upland and pima cotton cultivars released between 1970 and 1995. Miss. Agric. & Forestry Exp. Stn. Bull. 1069.

El-Zik, K.M., and P.M. Thaxton. 1989. Genetic improvement for resistance to pests and stresses in cotton. p. 191–224. *In* R.E. Frisbie et al. (ed.) Integrated pest management systems and cotton production. John Wiley & Sons, New York.

El-Zik, K.M., and P.M. Thaxton. 1990. Registration of 'Tamcot HQ95' cotton. Crop Sci. 30:1359–1360.

El-Zik, K.M., and P.M. Thaxton. 1996. Registration of 'Tamcot Sphinx' cotton. Crop Sci. 36:1074.

P.M. Thaxton and K.M. El-Zik, Dep. of Soil and Crop Sciences, Texas Agric. Exp. Stn., Texas A&M Univ. System, College Station, TX 77843-2474. Registration by CSSA. Accepted 31 March 2003. *Corresponding author (pthaxton@ag.tamu.edu).

Published in Crop Sci. 43:2299–2300 (2003).

Registration of 'Lamont' Oat

'Lamont' hulless-seeded spring oat (*Avena sativa* L.) (Reg. no. CV-370, PI 595901) was developed cooperatively by the USDA-ARS and the Idaho Agricultural Experiment Station. It was formally released by these agencies in June 2000. Lamont was released as a well-adapted spring oat with high yield potential for producers interested in hulless oat production and marketing in Idaho and other western states.

Lamont was selected from a cross of 79Ab3811/S7884. The hulless parent 79Ab3811 was developed by Agricultural Research Service at the University of Idaho Aberdeen Research and Extension Center from a cross of 69Ab1011/'Corbit' (CV-302) (Wesenberg et al., 1982). S7884, a hulled parent, was developed by the University of Saskatchewan at Saskatoon, SK. Lamont originated at Aberdeen, ID, as a F_4 head row selection in 1986 and was identified as 86Ab1616 before release. Breeder seed of Lamont originated as a bulk of 17 uniform head rows grown at the Aberdeen Research and Extension Center in 1991, and subsequently grown in large increase plots at the Tetonia Research and Extension Center in 1992.

Lamont is a midseason, spring oat with equilateral panicles, hulless kernels, blue-green foliage, and erect juvenile plant growth. Occasional plants appear that are typically 8 to 13 cm taller than the norm, but otherwise similar in appearance. The taller plants seem to have an abnormally long elongation of the culm between the flag leaf and the base of the panicle.

Lamont was first tested in replicated trials in Idaho in 1988. It has been widely tested in both irrigated and dryland trials in Idaho and other western states since regional testing in the Uniform Northwestern States Oat Nursery was initiated in 1993. It also has been tested in trials in western Canada as well as the Cooperative Naked Oat Test, the latter including several locations in the Midwest, the eastern U.S., and eastern Canada. Lamont has a good yield record in Idaho and other locations in the West, especially compared with other currently available hulless oat cultivars. In 6 station-years of testing in irrigated trials at Aberdeen, ID, in 1993 through 1998, Lamont averaged 6397 kg ha^{-1} in yield with an average of nearly 93% hulless kernels, resulting in a groat yield of about 6253 kg ha^{-1}. Groat yields for other cultivars in the same trials were 5944 kg ha^{-1} for 'Monida', 5330 kg ha^{-1} for 'Ogle', 5696 kg ha^{-1} for 'Paul', and 3824 kg ha^{-1} for 'Pennuda'. Monida and Ogle are hulled cultivars and Paul and Pennuda are hulless cultivars. In 4 station-years of testing in irrigated trials at Tetonia, ID, in 1995 through 1998, Lamont averaged 4620 kg ha^{-1} and Paul averaged 3677 kg ha^{-1}. In 4 station-years of testing in dryland trials at Tetonia, ID, in 1995 through 1998, Lamont averaged 3634 kg ha^{-1} in yield and Paul averaged 2570 kg ha^{-1}.

Lamont is similar to the hulless cultivar Paul and the hulled cultivars Monida and Otana in height, averaging 10 cm shorter than Paul, 3 cm shorter than Monida, and 10 cm shorter than Otana in trials at Aberdeen. Lamont has a record of greater lodging resistance than both Otana and Monida in trials at Aberdeen. Lamont is from 2 to 4 d later than Monida in heading. Test weight is a lesser issue in hulless oats relative to hulled cultivars, but, nevertheless, Lamont has very good test weight, averaging nearly 631 kg m^{-3} in 12 trials under irrigation at Aberdeen in 1993 through 1998. Protein content is influenced by both environment and yield level, with high yield levels typically associated with reduced protein content. Lamont has good groat protein content in trials in southern Idaho, but probably reflecting in part high yields, protein content is intermediate relative to other oat cultivars, averaging 16.6% under irrigation at Aberdeen (seven trials); 17.6% in irrigated trials at Tetonia (four trials); and 18.6% in dryland trials at Tetonia (four trials).

Lamont is expected to compete favorably with existing spring oat cultivars, especially hulless oat cultivars, in dryland environments in Idaho and other western states, with the high yield potential, good shattering resistance, and satisfactory lodging resistance of Lamont being of importance to many growers. Although Lamont is probably too tall for most irrigated environments, it has produced excellent yields with little lodging in short season locations such as Tetonia, ID, under moderate irrigation. Producers should be aware the groats of hulless oat cultivars typically have a high frequency of exposed trichomes or hairs that cause skin irritation during harvest and handling operations. Hulless oat also reportedly have a greater tendency to plug some handling equipment.

Genetic material of this release has been deposited in the USDA-ARS National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new cultivars. Breeder and Foundation seed of Lamont will be maintained by the Idaho Agricultural Experiment Station, Foundation Seed Program. Requests for Breeder and Foundation seed should be directed to the Coordinator, Foundation Seed Program, Kimberly Research and Extension Center, 3793 N 3600 E, Kimberly, ID 83341.

C.A. Erickson,* D.M. Wesenberg, D.E. Burrup, and J.C. Whitmore

References

Wesenberg, D.M., R.M. Hayes, J.A. Benson, and G.F. Carnahan. 1982. Registration of Corbit oats. Crop Sci. 22:687.

C.A. Erickson, D.M. Wesenberg, and D.E. Burrup, USDA-ARS, Univ. of Idaho Aberdeen Res. & Ext. Ctr., USDA-ARS Natl. Small Grains Germplasm Res. Facility, 1691 S. 2700 W., Aberdeen, ID 83210; J.C. Whitmore, Univ. of Idaho Tetonia Res. & Ext. Ctr., 888 West Highway 33, Newdale, ID 83436. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (nsgcce@ars-grin.gov).

Published in Crop Sci. 43:2300–2301 (2003).

Registration of 'Provena' Oat

'Provena' short-strawed hulless-seeded spring oat (*Avena sativa* L.) (Reg. no. CV-371, PI 595902), was developed cooperatively by USDA-ARS and the Idaho Agricultural Experiment Station. It was formally released by these agencies in June 2000. Provena is adapted to production throughout the western USA.

Provena is from a cross of 'Pennlo'/PI 447276. Pennlo (GP-23) was developed by ARS scientists at Pennsylvania State University, University Park, PA, (Marshall et al.,1983). PI 447276, equivalent to 'Yung 492', originated in Inner Mongolia and was introduced to the USA from the Peoples Republic of China in 1980. The cross of Pennlo/PI 447276 was made by ARS scientists at Pennsylvania State University. Selections were made at Aberdeen, ID, from early generation seed shared with ARS scientists stationed at the University of Idaho Aberdeen Research and Extension Center. Provena originated at Aberdeen, ID, as a F_4 head row selection in 1988 and was identified as 88Ab3073 before release. Breeder seed of Provena originated as a bulk from 100 uniform head rows grown at the Aberdeen Research and Extension Center in 1991, and subsequently grown at the Tetonia Research and Extension Center in 1992.

Provena is a midseason, short-strawed, hulless spring oat with equilateral panicles, hulless kernels, and blue-green foliage. Juvenile plant growth is erect. Occasional plants appear in the field that are typically 5 to 10 cm taller than the norm, but otherwise similar in appearance.

Provena was first tested in replicated trials in Idaho in 1990. It has been widely tested in both irrigated and dryland trials in Idaho and other western states since regional testing in the Uniform Northwestern States Oat Nursery was initiated in 1992. It also has been tested in trials in western Canada as well as the Cooperative Naked Oat Test, the latter including several locations in the Midwest, the eastern USA, and eastern Canada. Provena is the shortest strawed hulless oat cultivar currently available that is adapted to production in the western USA. It has a good yield record in Idaho and other locations in the West, especially compared to other short-strawed hulless cultivars. In six station-years of testing in irrigated trials at Aberdeen, ID, in 1993 through 1998, Provena averaged 5190 kg ha^{-1} in grain yield with an average of over 97% hulless kernels, resulting in a groat yield of about 5146 kg ha^{-1}. Groat yields for other cultivars in the same trials were 5944 kg ha^{-1}

for Monida, 5330 kg ha^{-1} for Ogle, 5696 kg ha^{-1} for Paul, and 3824 kg ha^{-1} for Pennuda. Monida and Ogle are hulled cultivars and Paul and Pennuda are hulless cultivars. In 4 station-years of testing in irrigated trials at Tetonia, ID, in 1995 through 1998, Provena averaged 4190 kg ha^{-1} and Paul averaged 3677 kg ha^{-1}. In 4 station-years of testing in dryland trials at Tetonia, ID, in 1995 through 1998, Provena averaged 2760 kg ha^{-1} and Paul averaged 2570 kg ha^{-1}.

Provena is shorter in height than Monida, 'Otana', and Paul, (13, 23, and 23 cm, respectively, in trials at Aberdeen). Provena is superior to both Otana and Monida in lodging resistance. Provena headed about two days earlier than Monida. Test weight is a lesser issue in hulless oats relative to hulled cultivars, but, nevertheless, Provena has very good test weight, averaging 622 kg m^{-3} in 6 yr of testing under irrigation at Aberdeen. The groat protein content of Provena is typically equal or superior to other adapted oat cultivars in trials in southern Idaho, averaging 18.4% under irrigation at Aberdeen (seven trials), 18.0% in irrigated trials at Tetonia (four trials), and 21.1% in dryland trials at Tetonia (four trials).

Provena offers the option of a well-adapted, short-strawed oat for producers interested in hulless oat production and marketing in Idaho and in other western states. Provena is expected to favorably compete with existing spring oat cultivars, especially hulless oat cultivars, in irrigated and higher rainfall dryland environments in Idaho and in other western states with its short straw and good lodging and shattering resistance, combined with its good expression of the hulless trait. Producers should be aware the groats of hulless oat cultivars typically have a high frequency of exposed trichomes or hairs that cause skin irritation during harvest and handling operations. Hulless oats also have a greater tendency to plug some handling equipment.

Genetic material of this release has been deposited in the USDA-ARS National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new cultivars. Breeder and Foundation seed of Provena will be maintained by the Idaho Agricultural Experiment Station, Foundation Seed Program. Requests for Breeder and Foundation seed should be directed to the Coordinator, Foundation Seed Program, Kimberly Research and Extension Center, 3793 N 3600 E, Kimberly, ID 83341.

C.A. Erickson,* D.M. Wesenberg, D.E. Burrup,
J.C. Whitmore, and H. G. Marshall

References

Marshall, H.G., F.L. Kolb, and J.A. Frank. 1983. Registration of Pennlo and Pennline 6571 oat germplasm lines. Crop Sci. 23:404.

C.A. Erickson, D.M. Wesenberg, and D.E. Burrup, USDA-ARS, Univ. of Idaho Aberdeen Res. & Ext. Ctr., USDA-ARS Natl. Small Grains Germplasm Res. Facility, P.O. Box 307, Aberdeen, ID 83210; J.C. Whitmore, Univ. of Idaho Tetonia Res. & Ext. Ctr., 888 West Highway 33, Newdale, ID 83436; H. G. Marshall, Marshall Farm, 1422 E. College Ave., Bellefonte, PA 16823. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (nsgcce@ars-grin.gov).

Published in Crop Sci. 43:2301–2302 (2003).

Registration of 'Outlook' Wheat

'Outlook' (Reg. no. CV-931; PI 632252) is a hard red spring wheat (*Triticum aestivum* L.) developed by the Montana Agricultural Experiment Station and released in February 2002. Outlook is targeted for all production areas of Montana on the basis of its resistance to the Russian wheat aphid [*Diuraphis noxia* (Mordvilko)], high yield potential, and good bread-baking characteristics

Outlook was derived as an F_4 plant selection from the cross PI 372129/2*'Amidon' (PI 527682)//MT7810/MT7926. PI 372129 is resistant to the Russian wheat aphid due to the presence of resistance gene *Dn4* (Nkongolo et al., 1991). MT 7810 ('Tezanos Pintos Precos'/'Sonora 64'//'Fortuna') was a sister line to 'Glenman' (McNeal et al., 1985). MT 7926 was derived from the cross ND 681/MT 6830. MT 6830 has the pedigree 'Sheridan'//CI 13253/*5'Centana'. ND 681 was an experimental line from North Dakota State University of unknown pedigree.

The breeding procedure for Outlook included two generations of single seed descent with no selection, and subsequent evaluation for height, maturity, and vigor in space-planted F_4 rows. F_5 head rows were evaluated for height, maturity, grain protein, apparent yield potential, and resistance to the Russian wheat aphid. Selected rows were entered into a single row yield trial in Bozeman, and evaluated for yield potential, grain protein, and dough mixing properties. Superior lines from this nursery, including Outlook, were entered into statewide yield trials.

Outlook has middense, erect, and tapering heads with red awns and glumes. Glumes are acuminate and the shoulder is wanting. Kernels are red, ovate, midlong and have a medium brush. Kernels have a medium crease with rounded cheeks. Anthocyanin is absent in the coleoptile, and the flag leaf is erect. Mature plant color is red.

Outlook has resistance to the Russian wheat aphid on the basis of greenhouse evaluations conducted by S. Haley at Colorado State University in 2000 and 2001. On the basis of a scoring system of 1 (resistant) to 5 (susceptible) (Nkongolo et al., 1991), Outlook had an average score of 2.3 compared to an average score of 5.0 for the susceptible 'McNeal' (Lanning et al., 1995). Outlook also did not display symptoms in a naturally occurring Russian wheat aphid infestation under field conditions at Moccasin, MT, in 2000. Outlook contains the dominant microsatellite marker *gwm106*, which is approximately 7 centimorgans from *Dn4* (Liu et al., 2002). Outlook is resistant to stem rust (caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks. & E. Henn.) on the basis of artificial inoculation in 1998 to 2001 with a bulk of urediospores collected in eastern Montana from 1990 to 1996. Race composition of the bulk is not known. Outlook is moderately resistant to the Stagonospora blotch (caused by *Stagonospora nodurum* Berk.) on the basis of a natural infection near Sidney, MT, in 2001. No data are available regarding reaction of Outlook to leaf rust (caused by *Puccinia triticina* Eriks.) or stripe rust (caused by *Puccinia striiformis* Westend). Outlook is susceptible to damage caused by the wheat stem sawfly (*Cephus cinctus* Nort.).

Outlook was evaluated in a Preliminary Yield Nursery at four Montana locations in 1998, and has been tested yearly at Montana locations since 1999. Outlook was entered into the Uniform Regional Hard Red Spring Wheat Nursery in 2001 and 2002 under the experimental number MT 9874. Mean grain yield of Outlook over 27 location–years from 1999 to 2001 was 4891 kg ha^{-1}, compared to 4750 kg ha^{-1} for McNeal. McNeal has been the most widely grown spring wheat cultivar in Montana from 1997 to 2002. In 18 dryland nurseries, Outlook and McNeal had grain yields of 3309 and 3238 kg ha^{-1}, respectively. Outlook and McNeal had grain yields of 7122 and 6920 kg ha^{-1}, respectively, at nine irrigated sites. Mean grain volume was 764 and 760 kg m^{-3} for Outlook and McNeal, respectively, over 27 location–years. Average heading date for Outlook is June 24, which is approximately 0.5 d later than McNeal. This is relatively late for a spring wheat cultivar grown in Montana. The average plant height for Outlook was 81.2 cm over 27 location/years, which is equivalent to McNeal. Observation of segregation patterns indicates that Outlook contains the *Rht2* gene for semidwarf habit, as does McNeal (Storlie et al., 1996).

Grain protein of Outlook over 27 location–years averaged 148 g kg^{-1}, which is 2 g kg^{-1} lower than McNeal. Milling and baking data from nine locations shows flour protein of Outlook to be 12.2 g kg^{-1}, which is 0.3 g kg^{-1} higher than McNeal. Flour yield of Outlook was 68.3% as opposed to 66.2% for McNeal. Flour ash of Outlook was similar to McNeal at 0.42%. Bake water absorption for Outlook and McNeal were 72.3 and 73.8%, respectively. Bake mix time of Outlook was 4.7 min, which is 4.3 min shorter than McNeal. Final loaf volume of Outlook and McNeal were similar, at 1053 and 1060 cm^3, respectively.

Breeder seed was developed by selection for uniformity among 400 head rows. Approximately 300 selected head rows were subsequently grown as four row plots at Bozeman, and aberrant types were discarded. Remaining head rows were bulked to form Breeder seed for Outlook. Breeder, Foundation, Registered, and Certified classes are recognized. Application will be made for U.S. Plant Variety Protection. Breeder and Foundation seed stocks of Outlook will be maintained by the Plant Sciences and Plant Pathology Department, Montana Agricultural Experiment Station, Bozeman MT 59717. Small quantities of seed are available for research purposes on request from the corresponding author.

S.P. Lanning, D. Habernicht, D.M. Wichman, K.D. Kephart, R.N. Stougaard, G.D. Kushnak, J.L. Eckhoff, G.R. Carlson, W.E. Grey, and L.E. Talbert*

References

Lanning, S.P., L.E. Talbert, C.F. McGuire, H.F. Bowman, G.R. Carlson, J.L. Eckhoff, G.D. Kushnak, R.N. Stougaard, and D.M. Wichman. 1995. Registration of McNeal wheat. Crop Sci. 34:1126–1127.

Liu, X.M., C.M. Smith, and B.S. Gill. 2002. Identification of microsatellite markers linked to Russian wheat aphid resistance genes *Dn4* and *Dn6.* Theor. Appl. Genet. 104:1042–1048.

McNeal, F.H., W.L. Alexander, C.F. McGuire, J.W. Bergman, G.R. Carlson, A.L. Dubbs, G.D. Kushnak, G.F. Stallknecht, V.R. Stewart, E.L. Sharp, and B.K. Sally. 1985. Registration of Glenman wheat. Crop Sci. 25:575.

Nkongolo, K.K., J.S. Quick, F.B. Peairs, and W.L. Meyer. 1991. Inheritance and resistance of PI 372129 to the Russian wheat aphid. Crop Sci. 31:905–906.

Storlie, E.W., H. Xie, and L.E. Talbert. 1996. Tall off-types in semidwarf spring wheat with height-reducing genes *Rht1* and *Rht2.* Crop Sci. 36:1521–1522.

S.P. Lanning, D. Habernicht, W.E. Grey, L.E. Talbert, Plant Sciences and Plant Pathology Department, Montana State University, Bozeman, MT 59717; D.M. Wichman, Central Agric. Res. Center, HC90-Box 20, Moccasin, MT 59462. K.D. Kephart, Southern Agric. Res. Center, 748 Railroad Highway, Huntley MT 50037; R.N. Stougaard, Northwestern Agric. Res. Center, 4570 Montana 35, Kalispell, MT 59901. G.D. Kushnak, Western Triangle Res. Center, P.O. Box 1474, Conrad, MT 59425; J.L. Eckhoff, Eastern Agric. Res. Center, Box 393, Sidney, MT 59270; G.R. Carlson, Northern Agric. Res. Center, Star Rt. 36, Havre, MT 59501. Research was supported in part by the Montana Wheat and Barley Committee. Registration by CSSA. Accepted 31 March 2003. *Corresponding author (usslt@montana.edu).

Published in Crop Sci. 43:2302–2303 (2003).

Registration of 'Niobe' Barley

'Niobe', a two-rowed, spring barley (*Hordeum vulgare* L.) (Reg. no. CV-309, PI 632404), was developed by the Field Crop Development Centre (FCDC), Lacombe, AB, Canada. Niobe has been registered in Canada by the Canadian Food Inspection Agency, Ottawa, ON, Canada (Canadian Reg. no. 5500). Niobe was tested by FCDC as H92031021 and in the Western Co-operative Two-Row Barley Registration Test as TR651. Niobe was selected from the cross 'AC Oxbow'/'CDC Guardian'. AC Oxbow is a two-rowed malting barley developed at the Agriculture and Agri-Food Canada Cereal Research Centre in Winnipeg, MB, Canada (Government of Canada, 2003). CDC Guardian is a two-rowed feed barley developed at the Crop Development Centre in Saskatoon, SK, Canada (Rossnagel and Harvey, 1991).

The cross of AC Oxbow with CDC Guardian was made in the field during the summer of 1992. Two-hundred spikes were selected, on the basis of visual assessment, from the F_2 bulk population and advanced via single seed descent at the Crop Development Centre at Saskatoon to the F_5 generation during the winter of 1993-1994. Two hundred F_5 headrows were grown out in the field at Lacombe in the summer of 1994 from which the line H92031021 was selected on the basis of disease resistance {to scald [causal agent *Rhynchosporium secalis* (Oudem.) J.J. Davis] and smut (causal agents *Ustilago* spp.)}, quality [protein and other traits based on near infrared spectroscopy (NIRS) analyses (Oatway and Helm, 1999)], and agronomic type (straw strength, maturity). Yield, quality, and further disease testing began in the summer of 1995 at Lacombe. From 1996 to1999, the line was tested in multi-location field tests throughout western Canada. In these trials, Niobe yielded 3.5% higher than 'CDC Dolly' (Rossnagel and Harvey, 1994), the feed check cultivar, when site mean yields were greater than 8.0 Mg ha^{-1}; while under lower yielding conditions (site mean yields less than 4 Mg ha^{-1}), yields of Niobe were 8.2% lower than those of CDC Dolly.

In the Western Co-operative Two-Row Barley Registration Test (2000 and 2001), Niobe had a mean grain yield over 32 sites of 5.10 Mg ha^{-1}, similar to the mean grain yield of 5.07 Mg ha^{-1} for CDC Dolly. Over the 29 sites that maturity was measured, Niobe reached maturity in approximately 94 d, 1 d earlier than CDC Dolly. While Niobe was slightly taller at 79 cm than CDC Dolly at 73 cm, it had a better lodging score (scale 0–9) of 4 versus 6 for CDC Dolly. Niobe had the same test weight at 66 kg hL^{-1} as CDC Dolly, but its kernel weight was only 42 mg and percent plump only 86% versus 47 mg and 93%, respectively, for CDC Dolly.

Niobe is resistant to the surface-borne smuts but moderately susceptible to true loose smut [causal agent *U. nuda* (Jens.) Rostr.]. Niobe is moderately resistant to the spot form of net blotch (causal agent *Pyrenophora teres* Dreschs. forma *maculata*) but moderately susceptible to the net form (*P. teres* forma *teres*). Niobe has seedling resistance to scald [causal agent *Rhynchosporium secalis* (Oudem.) J.J. Davis]; but as an adult plant, its reactions range from moderately resistant to susceptible depending on races of scald. Niobe is moderately resistant to moderately susceptible to stem rust (causal agent *Puccinia graminis* Pers. f. sp. *tritici* Erikss. and Henn.) depending on the races of stem rust. Niobe is moderately susceptible to common root rot and spot blotch [causal agent *Cochliobolus sativus* (Ito and Kuribayashi) Dreschs. Ex Dastur]. Niobe is susceptible to Fusarium head blight (causal agents *Fusarium* spp.) and Septoria speckled leaf blotch (causal agent *Septoria passerinii* Sacc.).

Niobe has an intermediate juvenile growth habit, a green coleoptile with medium elongation, and glabrous green sheaths and blades of its lower leaves. At the boot growth stage, leaves have a slight waxy bloom and glabrous sheaths. Niobe has a narrow, medium-long flag leaf with a drooping attitude, purple auricles, glabrous auricle margins and blade, and a pronounced waxy sheath. After heading, the spike has slight (0–3 cm) exertion. The stem has five elongated nodes, medium thickness, a medium green color, and a pronounced waxy bloom. Collar shape is closed and the neck shape is snaked (hooked). The spike has a strap (parallel) shape with medium density, horizontal attitude, and slight waxy bloom. The glumes are mid-long with a purplish tip, covered with medium-long hairs, and have rough awns equal in length to the glumes. The lemma awns are long and rough with a purplish color and a few barbs on the lateral veins. The kernels have colorless aleurones, medium long rachillas with short rachilla hairs, clasping lodicules, and horseshoe basal markings.

From the F_7 to F_9 generations, increase plots were grown from which spikes were selected to grow F_{10} headrows. One hundred eighty-eight plots and associated headrows were grown from selected uniform F_{10} headrows. Seed from these plots and headrows was bulked to form the Breeder seed. Breeder seed will be maintained by FCDC, Lacombe, AB, Canada. Niobe will be distributed through SeCan Association, 201-52 Antares Drive, Ottawa, Ontario K2E 7Z1 Canada, Electronic mail: seed@secan.com. Application has been made in Canada for plant breeders' rights (Reg. no. 02-3056).

P.E. Juskiw,* J.H. Helm, J. Nyachiro, M. Cortez, M. Oro, and D.F. Salmon

Acknowledgments

Our thanks to Dr. Kequan Xi for his pathological expertise, and to John Bowness, Tim Duggan, Dave Dyson, Lori Oatway, and Donna Westling for their excellent technical support.

References

Government of Canada. 2003. List of varieties which are registered in Canada [Online]. Available at http://www.inspection.gc.ca/english/plaveg/variet/lovric.pdf (verified 8 May 2003).

Oatway, L., and J.H. Helm. 1999. The use of near infrared reflectance spectroscopy to determine quality characteristics in whole grain barley. p. 70–72. *In* 16th American Barley Researchers Workshop, Idaho Falls, ID. 11–15 July 1999.

Rossnagel, B.G., and B.L. Harvey. 1991. CDC Guardian Two-row Feed Barley. 35:122. *In* K.W. May (ed.) Barley Newsl. American Malting Barley Association, Inc., Milwaukee, WI.

Rossnagel, B.G., and B.L. Harvey. 1994. CDC Dolly Two-row Feed Barley. 38:109. *In* R.D. Horsley (ed.) Barley Newsl. American Malting Barley Association, Inc., Milwaukee, WI.

Field Crop Development Centre, Alberta Agriculture, Food and Rural Development, 5030-50th Street, Lacombe, AB, Canada T4L 1W8. Registration by CSSA. Accepted 31 March 2003. *Corresponding author (patricia.juskiw@gov.ab.ca).

Published in Crop Sci. 43:2303–2304 (2003).

Registration of 'Barimung-5' Mungbean

Barimung-5 Mungbean [*Vigna radiata* (L.) Wilczek] (Reg. no. CV-209, PI 632914) was developed at the Pulses Research Centre (PRC), Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur- 1701, Bangladesh. The cultivar was released in Bangladesh in 1999 for stable and high yield with combined resistance to *Mungbeanyellow mosaic virus* (MYMV) and Cercospora leaf spot (CLS) (caused by *Cercospora cruenta* Sac. *or Cercospora canescens* Ell. & Mart.).

Barimung-5 (NM 92) was introduced from Asian Vegetable Research and Development Center (AVRDC). In 1992, 33 advanced mungbean lines were received from AVRDC, Taiwan. The material was tested in the first year at the research field of Pulses Research Centre at Ishurdi, Pabna, Bangladesh, along with local released cultivars. A series of field trials were conducted across locations and years. Among the lines–cultivars, NM 92 from AVRDC consistently performed better in terms of yield with synchronous maturity. Days to maturity, reaction to disease, growth habit, podding intensity, and seed yield were given priority during selection. NM 92 was evaluated in preliminary, advanced and regional yield trials during the Kharif-I, Kharif-II, and Late rabi seasons of 1992-1993, 1993-1994, and 1994-1995 at four locations (BARI, 1996).

Yield trials over 3 yr in different mungbean growing areas in three cropping seasons in Bangladesh showed that Barimung-5 averaged 1400 kg ha^{-1}, compared to 1200 kg ha^{-1} for the check cultivar Barimung-2 (Afzal et al., 1998) Barimung-5 had a 30% yield advantage over Barimung-2 and 60% advantage over the local check 'Barisal Local' and gave consistently higher yield throughout the trials (BARI, 1996). Because of its wide adaptability, the cultivar is recommended for three different mungbean growing seasons [Kharif-II (August-October), Kharif-I (February-May), and late rabi (January-April)] and for all mungbean growing areas of Bangladesh.

Barimung-5 has an erect growth habit and attains a height of 30 to 40 cm. It flowers in 30 to 35 d after emergence and reaches physiological maturity 55 to 60 d after emergence. Leaves are trifoliate, alternate, and green. Leaf pubescence is absent or sparse. Petioles are short and purple-green. The corolla is yellowish-green. The raceme position is above the canopy. Mature pods are black. Seeds are drum-shaped, dull and greenish. Barimung-5 has a 100-seed weight of about 4.2 g (Afzal et al., 1998). The hypocotyls are purple.

Barimung-5 is resistant to MYMV and CLS. During initial evaluation, the families or lines were screened for combined resistance by means of the spreader row technique (Bakr, 1994). Cultivars that are highly susceptible to MYMV (IMN 86) and CLS (M 99) were planted after every five families or lines to create artificial diseases pressure. Barimung-5 was rated as 0 on a 0-to-5 rating scale (where 0 is no diseases symptom and 5 is severe disease symptoms) for both diseases throughout its evaluation across locations (BARI, 1996).

Seeds of Barimung-5 have 80.2% cotyledon content, and produce 68.8% head *dhal* (intact cotyledon after splitting) by the traditional method of dehulling. It takes about 18 min to cook and shows solid dispersion of 26.4%. Barimung-5 contains 205 g kg^{-1} protein and 470 g kg^{-1} carbohydrate (Afzal et al., 1997).

Breeder seed of Barimung-5 was distributed to the Bangladesh Agricultural Development Corporation (BADC) for producing Foundation and Certified seed. Breeder seed will be maintained jointly by the Pulses Research Centre, Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur-1701, Bangladesh. U.S. Plant Variety Protection for Barimung-5 will not be applied for. Small quantities of seed for research purposes may be obtained from the corresponding author or from AVRDC for at least 5 yr from the date of this publication.

M.A. Afzal,* M.A Bakr, Nusrat Karim Luna, M.M. Rahman, A. Hamid, M. Moynul Haque, and S. Shanmugasundaram

References

Afzal, M.A., A.N.M.M. Murshed, M. Abu Bakr, A. Hamid, and A.B.M. Salahuddin. 1998. Mungbean cultivation in Bangladesh [Bangla Booklet]. Pulses Research Station, BARI, Gazipur- 1701.

In collaboration with AVRDC-USAID Bangladesh Project. Publication no. 17. Gazipur, Bangladesh.
Afzal, M.A., A.N.M.M. Murshed, M.M. Rahman, M.A. Bakr, and M.L. Chandha. 1997. Three newly released mungbean varieties in Bangladesh. International consultation workshop on mungbean: Proceedings of the Mungbean workshop, 7–11 September 1997, New Delhi, India. Asian Vegetable Research and Development Center, Shanhua, Tainan, Taiwan.
Bakr, M.A. 1994. Checklist of pulses diseases in Bangladesh. Bangladesh J. Plant Pathol. 10 (1&2):13–16.
BARI. 1996. Pulses Research Centre Annual Report for1994. Bangladesh Agricultural Research Institute (BARI), Gazipur, Bangladesh.

M.A. Afzal, M.A. Bakr, Nusrat Karim Luna and M.M. Rahman, Pulses Research Centre, Bangladesh Agricultural Research Institute (BARI), Gazipur, Bangladesh; A. Hamid, M. Moynul Haque, Bangabadhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Department of Agronomy, Gaqipur-1701, Bangladesh. S. Shanmugasundaram, Asian Vegetable Research and Development Center P.O. Box 42, Shanhua, Tainan, Taiwan 741, R.O.C. Registration by CSSA. Accepted 31 March 2003. *Corresponding author (aafzal@bdcom.com).

Published in Crop Sci. 43:2304–2305 (2003).

Registration of 'Santee' Soybean

'Santee' soybean [*Glycine max* (L.) Merr.] (Reg. no. CV-453, PI 617041) was developed and released by the South Carolina Agriculture and Forestry Research System in March 2001 because of its multiple-pest resistance traits and excellent seed yields.

Santee traces to a single plant selection in the F_4 generation from the cross Coker 82-622 × 'Hutcheson' (Buss et al., 1988). Coker 82-622 is a selection from 'Braxton' × 'Coker 368' (Bernard et al., 1988). Coker 368 is a selection from Co71-211 × 'Centennial' (Hartwig and Epps, 1977). Co71-211 is a selection from 'Hampton 266' × 'Bragg' (Hinson and Hartwig, 1964). Hampton 266 is a selection from 'Hampton' (Webb and Hicks, 1965). The cross was made at Clemson, S.C., in 1988. The F_1 generation was grown in Puerto Rico in the winter 1988-1989 and the F_2 to F_4 generations were advanced by the pod-bulk method in South Carolina and Puerto Rico during 1989 and 1990 (Fehr, 1987). The strain SC91-2007 was composited in the F_5 generation in 1991.

Preliminary agronomic evaluations of SC91-2007 were conducted in South Carolina trials in 1992 and 1993. SC91-2007 was evaluated in the USDA Southern Uniform Regional Tests for nematode resistance, disease resistance and agronomic performance from 1994 to 1997 (Kenty and Mosley, 1995; Tyler and Bell, 1998). One hundred-forty single plants of SC91-2007 were harvested in 1996 and F_{10} (F_9-derived) plant rows were evaluated in 1997 for uniformity of flower color, pubescence color, maturity, and plant appearance. Seed from 83 rows that appeared uniform and true to type for agronomic traits and resistance to soybean cyst nematode (SCN), race 3 (*Heterodera glycines* Ichinohe) were bulked and increased to produce Breeder seed. Breeder seed of SC91-2007 were increased in 1999 and 2000.

SC91-2007 was tested as a late maturity group VI strain, but because it matures 4 to 5 d later than 'Boggs', a late-group VI cultivar (Tyler and Bell, 1998; Boerma et al., 2000), it was released as a group VII cultivar. Breeder seed of SC91-2007 was released to South Carolina Foundation Seed Association for planting in 2000, and was released as 'Santee' in March 2001. Santee is adapted to the southern USA where maturity group VII cultivars are normally grown. In USDA tests, it averaged 18 cm taller than Boggs and 10 cm taller than 'Dillon' (Tyler and Bell, 1998; Shipe et al., 1997). Lodging rating (where 1 = all plants upright and 5 = all plants prostrate) for Santee (score of 2.0) was the same as 'Brim', slightly lower than Boggs (score of 2.2), and slightly higher than Dillon (score of 1.4) (Burton et al., 1994). Plants have white flowers, gray pubescence, and tan pod walls. Seeds are yellow with variable buff hila. Seed size of Santee averages 14.1 g 100 seed^{-1} compared to 14.3 g 100 seed^{-1} for Dillon. Seed quality is good, and seed composition on a dry weight basis averages 429 g kg^{-1} protein and 208 g kg^{-1} oil, compared to 427 g kg^{-1} protein and 205 g kg^{-1} oil for Dillon (Tyler and Bell, 1998).

Santee combines excellent seed yield potential with multiple-pest resistance traits. Mean seed yield of Santee exceeded Boggs by 2% and both Dillon and Brim by 4% in 61 USDA Southern Uniform Regional Tests (Tyler and Bell, 1998). In South Carolina Official Variety Tests over 2 yr, Santee averaged 2% less in seed yield than 'N7001', a group VII cultivar (Barefield and Stancil, 2002; Carter et al., 2003). Santee and N7001 were equal in seed yield (3024 kg ha^{-1}) averaged over two years in North Carolina Official Variety Tests (Bowman, 2002).

Santee is resistant to SCN race 3, reniform nematode (*Rotylenchulus reniformis* Linford & Oliveira), and stem canker disease [caused by *Diaporthe phaseolorum* (Cooke and Ellis) Sacc. f. sp. *meridionalis* Morgan-Jones] (Robbins et al., 1999; Tyler and Bell, 1998). It is moderately resistant to southern root-knot nematode [*Meloidogyne incognita* (Kofoid & White) Chitwood], averaging a 3-yr gall rating of 2.6 on a 1 (resistant) to 5 (susceptible) scale in greenhouse evaluations (Tyler and Bell, 1996; Tyler and Bell, 1997; Tyler and Bell, 1998). Santee is tolerant to Columbia lance nematode (*Hoplolaimus columbus* Sher). It averaged 32% higher in yield (3-yr mean) than highly intolerant Braxton and had yields similar to the tolerant cultivar 'Motte' in a field infested with Columbia lance nematode (Shipe et al., 2000).

Application was made for U.S. Plant Variety Protection, Title V option, permitting only Foundation and Certified classes beyond Breeder seed. Plant Variety Protection Certificate 200100207 was issued 12 Sept. 2001. The South Carolina Agriculture and Forestry Research System will be responsible for the maintenance of Breeder seed. A small quantity of seed for research purposes is available for at least 5 yr from the corresponding author.

E.R. Shipe,* J.D. Mueller, S.A. Lewis, P.F. Williams, Jr., and R.K. Stephens

References

Barefield, D.K., Jr., and B.D. Stancil. 2002. Crop variety test program. Dep. Crop and Soil Sciences. Clemson Univ., Clemson, SC. Available at: http://www.clemson.edu/agronomy/vt/index.htm; verified 8 May 2003.
Bernard, R.L., G.A. Juvik, E.E. Hartwig, and C.J. Edwards, Jr. 1988. Origins and pedigrees of public soybean varieties in the United States and Canada. USDA Tech. Bull. 1746. U.S. Gov. Print. Office, Washington, DC.
Boerma, H.R., R.S. Hussey, D.V. Phillips, E.D. Wood, G.B. Rowan, and S.L. Finnerty. 2000. Registration of 'Boggs' soybean. Crop Sci. 40:294–295.
Bowman, D.T. 2002. North Carolina Measured Crop Performance 2002. Crop Sci. Res. Rep. No. 204.
Burton, J.W., T.E. Carter, Jr., and E.B. Huie. 1994. Registration of 'Brim' soybean. Crop Sci. 34:301.
Buss, G.R., H.M. Camper, Jr., and C.W. Roane. 1988. Registration of 'Hutcheson' soybean. Crop Sci. 28:1024.
Carter, T.E., Jr., J.W. Burton, D.T. Bowman, Zhanglin Cui, Xingliang Zhou, M.R. Villagarcia, A.S. Niewoehner, and M.O. Fountain. 2003. Registration of 'N7001' Soybean. Crop Sci. 43:1126–1127.
Fehr, W.R. 1987. Principles of cultivar development, Volume I. Macmillan Publishing Co., New York.

Hartwig, E.E., and J.M. Epps. 1977. Registration of Centennial soybeans. Crop Sci. 17:979.
Hinson, K., and E.E. Hartwig. 1964. Bragg and Hardee soybeans. Crop Sci. 6:664.
Kenty, M.M., and S.D. Mosley. 1995. The uniform soybean tests, southern states, 1994. USDA-ARS, Stoneville, MS.
Robbins, R.T., L. Rakes, L.E. Jackson, and D.G. Dombek. 1999. Reniform nematode resistance in selected soybean cultivars. Suppl. J. Nematol. 31(4S):667–677.
Shipe, E.R., J.D. Mueller, S.A. Lewis, P.F. Williams, Jr., and J.P. Tomkins. 1997. Registration of 'Dillon' soybean. Crop Sci. 37:1983.
Shipe, E.R., J.D. Mueller, S.A. Lewis, P.F. Williams, Jr., and J.P. Tomkins. 2000. Registration of 'Motte' soybean. Crop Sci. 40: 1497–1498.
Tyler, J.M., and P.P. Bell. 1996. The uniform soybean tests, southern states, 1995. USDA-ARS, Stoneville, MS.
Tyler, J.M., and P.P. Bell. 1997. The uniform soybean tests, southern states, 1996.USDA-ARS, Stoneville, MS.
Tyler, J.M., and P.P. Bell. 1998. The uniform soybean tests, southern states, 1997.USDA-ARS, Stoneville, MS.
Webb, H.W., and J.D. Hicks, Jr. 1965. Coker Stuart and Hampton soybeans. Crop Sci. 5:199.

E.R. Shipe, P.F. Williams, Jr., and R.K. Stephens, Dep. of Crop and Soil Environmental Science, and S.A. Lewis, Dep. of Plant Pathology and Physiology, Clemson Univ., Clemson, SC 29634; and J.D. Mueller, Dep. of Plant Pathology and Physiology, Edisto Res. and Educ. Ctr., Blackville, SC 29817. Technical Contribution no. 4822 of the South Carolina Agriculture and Forestry Research System, Clemson Univ. Research supported by state and Hatch funds allocated to the South Carolina Agriculture and Forestry Research System and by grants from the South Carolina Soybean Board. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (eshipe@clemson.edu).

Published in Crop Sci. 43:2305–2306 (2003).

Registration of 'Freedom!' Red Clover

'Freedom!' red clover *(Trifolium pratense* L.) (Reg. no. CV-26, PI 629112) was developed by the Kentucky Agricultural Experiment Station and released in 2001. Freedom!, so named because of its freedom from pubescence (nonglandular trichomes or hairs), was developed to permit faster drying and to reduce dustiness of hay. Freedom! is a medium red clover adapted to the same general area as 'Kenland' (PI 300150) in the central clover region of the USA.

Freedom! was selected for low levels of pubescence from Kenland. Starting in 1992, seed of Kenland was germinated in a greenhouse and seedlings were transplanted to fields at Lexington, KY. The number of transplants ranged from 3080 to 6160 per year. Plants with low levels of stem pubescence were selected visually. Five cycles of selection were completed in 1996, with selection intensity ranging from 7.8 to 10.0%. Seed obtained in 1996 was sown in 1997 for increase and seed was harvested in 1998, which in turn was sown in 1999, and Breeder seed was harvested in 2000.

At Lexington in 1998, selection progress was evaluated by scoring a row seeding of all generations for pubescence on a scale of one to nine. A score of one indicated only a few hairs on the first internode below the flowering head. A score of nine indicated very dense pubescence throughout the length of the stem. The number of nonglandular trichomes on stems (first node from flowering head) was counted using a dissecting scope at 10× magnification. The number of trichomes mm^{-2} corresponding to a score of one was 0.56, ranging up to 15.4 for a score of nine. Pubescence scores for the cycles of selection that resulted in Freedom! were as follows: 1 = 7.1, 2 = 5.9, 3 = 5.7, 4 = 4.7, 5 = 3.4, and the check cultivar, Kenland, was 7.3. Pubescence scores and generations of selection were linearly correlated ($R^2 = 0.95$). Stem pubescence was also examined in a cultivar test at Lexington in 1997 and at Princeton, KY in 1999. Pubescence scores were significantly different ($P = 0.05$) at Lexington where Freedom! scored 3.2 and Kenland 6.3, and at Princeton where Freedom! scored 2.5 and Kenland 6.5. All other cultivars in the tests were significantly more pubescent than Freedom!. No significant differences in stem diameter were found among generations of selection or among cultivars at either Lexington or Princeton.

Seed yields of Freedom!, Kenland, and 'Kenstar' (Taylor and Anderson, 1973) were not significantly different in tests at Lexington in 1999 and 2000. Likewise, no differences existed in forage dry matter yields between Freedom! and Kenland in cultivar tests spanning 3-yr periods at Lexington, Princeton, and Quicksand, KY.

In 1995, mechanically conditioned field-cured hay of Freedom! had a drying rate during the first day of curing of 22.5% h^{-1} compared with a slower ($P = < 0.07$) drying rate of 17.7% h^{-1} for Kenland. In 1996, mechanically conditioned Freedom! dried at a rate of 18.2% h^{-1} compared with 15.7% h^{-1} for conditioned Kenland. Unconditioned hay of the same cultivars dried at rates of 14.0 and 13.1% h^{-1}, respectively. In another trial conducted during 1996, Freedom! dried faster than Kenland hay with conditioning but did not in the absence of conditioning.

Dustiness of Freedom! and Kenland hay were compared by means of dry sieves with 450-, 150-, and 45-μm openings. Freedom! hay had significantly less ($P < 0.01$) dry matter finer than 450 μm (6.0 g kg^{-1}) compared with Kenland (9.9 g kg^{-1}). Freedom! had 53% less dust passing through the 45-μm sieve than Kenland ($P < 0.03$) which had 0.9 g kg^{-1} of hay dry matter in that fraction.

We conclude that Freedom! differs from its parent cultivar in freedom from dust and rate of drying but does not differ in other characteristics such as seed yield, forage yield, and stem diameter. Field tests show that, because of reduced pubescence, Freedom! may be slightly more susceptible to insect attack than strongly pubescent cultivars.

Breeder seed will be maintained by Foundation Seed Project, Agriculture Experiment Station, University of Kentucky. Limited quantities of seed are available for testing purposes from the senior author. Recipients of seed are asked to acknowledge the source if Freedom! is used in the development of a new cultivar, germplasm, parental line, or genetic stock. Foundation and Certified seed classes will be permitted beyond breeder seed. U.S. Plant Variety Protection has not been applied for.

N.L. Taylor* and M. Collins

References

Taylor, N.L., and M.K. Anderson. 1973. Registration of Kenstar red clover. Crop Sci. 13:772.

Dep. of Agronomy, Kentucky Agricultural Experiment Station, University of Kentucky, Lexington, 40546-0091. Published with approval of the Director. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (nltaylor@uky.edu).

Published in Crop Sci. 43:2306 (2003).

Registration of 'Abilene' Rapeseed

'Abilene' winter rapeseed [*Brassica napus* L. subsp. *oleifera* (Metzg.) Sinsk. *f. biennis*] (Reg. no. CV-21, PI 632400) was developed by the Kansas Agricultural Experiment Station and released in 2002. Abilene has an edible quality oil (canola) and low glucosinolates in the meal.

Abilene was selected from the cross 'Indore'/'Sipal'//'Liraglu'/3/'Bienvenu'. Indore is a low glucosinolate industrial cultivar developed by Oregon State Agricultural Experiment Station (Calhoun et al., 1983). Sipal is a low erucic acid rapeseed with high glucosinolates developed by the Swedish Seed Association (Svalöv, Sweden). Liraglu is a low glucosinolate, winter hardy cultivar developed by Deutsche Saatveredelung (Lippstadt, Germany). Bienvenu is a low erucic acid, high glucosinolate cultivar developed by Ringot Seed Co. (France). The final cross was made in 1987 at the Idaho Agricultural Experiment Station at Moscow, ID. Abilene was selected from MO503-1, an F_5–derived population developed from this cross at Columbia, MO. A total of 231 single plants from this population were grown in isolation in the greenhouse in Manhattan, KS, in 1996. Seed from these plants was screened to identify low glucosinolate content by the Tes-tape method (Lein, 1970). Seed from low glucosinolate plants was tested to isolate plants with low erucic acid in the oil. Thirty-two lines derived from these single plants were evaluated in the field at four locations in the Great Plains in 1997-1998 and 13 lines were evaluated at 11 locations in 1998-1999. Abilene was evaluated as KSM3-1-124 in the National Winter Canola Trials at 24 locations in 1999-2000, 15 locations in 2000-2001, and 24 locations in 2001-2002.

The black seed of Abilene is low in erucic acid (average of 9 g kg^{-1} in the oil) and glucosinolates (average of 14.7 μmol g^{-1} in the oil-free meal). Mean yield of Abilene in the Great Plains region (21 locations) was 1607 kg ha^{-1}, or about 25 kg ha^{-1} greater than 'Wichita' (Rife et al., 2001a, b, 2002, 2003). Yield of Abilene in the Midwest region (24 locations) was 2262 kg ha^{-1}, or about 84 kg ha^{-1} greater than Wichita. Yield of Abilene in the Southeast region (18 locations) was 2206 kg ha^{-1}, or about 97 kg ha^{-1} greater than Wichita. Winter hardiness of Abilene is similar to other cultivars released by Kansas State University. Mean survival of Abilene was 75.9% (38 locations in the Midwest and Great Plains). This compares to 68.1% for 'Ceres' (Norddeutsche Pflanzenzucht, Germany), 76.8% for 'Plainsman' (Rife et al., 2000), and 78.2% for Wichita at the same locations.

Abilene is 1.2 d earlier than Wichita for 50% bloom date (104 d after January 1) and reaches maturity about the same time as Wichita (160 d after January 1). Abilene is 124 cm tall (0.7 cm taller than Wichita) and has an average total oil content of 370 g kg^{-1} (about the same as Wichita). Abilene has better than average resistance to shattering (13.9%) and better than average tolerance to lodging (11.9%). Test weight was 589 kg m^{-3} (7 kg m^{-3} less than Wichita). Evaluation for tolerance to white mold [caused by *Sclerotinia sclerotiorum* (Lib.) de Bary] has been limited. Abilene's response to virulent blackleg [caused by *Leptosphaeria maculans* (Desmaz.) Ces. and De Not.] is similar to that of 'Falcon' (Norddeutsche Pflanzenzucht, Germany), which is considered tolerant (Day et al., 2001, p. 17).

The application for U.S. Plant Variety Protection is pending. Seed increases will be limited to Foundation and Certified seed classes. Breeder and Foundation seed of Abilene will be maintained and distributed by the Kansas Agricultural Experiment Station.

C.L. Rife,* D.L. Auld, H.C. Minor,
W.F. Heer, D.D. Baltensperger,
L.A. Nelson, and D. Bordovsky

References

Calhoun, W., G.D. Jolliff, and J.M. Crane. 1983. Registration of 'Indore' Rapeseed. Crop Sci. 23:184–185.

Day, J.L., P.L. Raymer, A.E. Coy, and P.A. Rose. 2001. Georgia 2000–2001 Canola Performance Tests. Georgia Agric. Exp. Stn. Res. Rep. no. 645.

Lein, K.A. 1970. Methods for quantitative determination of seed glucosinolates of *Brassica* spp. and their application in plant breeding of rape low in glucosinolate content. Z. Pflanzenzuecht. 63:137–154.

Rife, C., R. Aiken, D. Auld, R. Bacon, D. Baltensperger, B. Beans, U. Bishnoi, H. Bhardwaj, D. Bordovsky, E. Cebert, E. Christmas, S. Conley, P. Evans, R. Freed, R. Ivy, W. Heer, K. Janssen, J. Johnson, J. Johnson, J. Kelly, J. Long, D. C. Morris, L. Nelson, P. Raymer, R. Saunders, M. Schmidt, D. Starner, W. Weibold, and M. Witt. 2002. 2001 National Winter Canola Variety Trial. Dep. Rep. Kansas Agric. Exp. Stn., Manhattan.

Rife, C., R. Aiken, R. Auld, R. Bacon, D. Baltensperger, U. Bishnoi, H. Bhardwaj, D. Bordovsky, E. Christmas, S. Conley, P. Evans, J. Fisher, R. Freed, W. Heer, K. Janssen, J. Johnson, J. Johnson, J. Kelly, J. Klein, R. Kochenower, J. Krall, K. Kusel, K. Larson, J. Long, L. Nelson, P. Raymer, M. Schmidt, F. Schweissing, R. Smoot, D. Starner, and M. Witt. 2003. 2002 National Winter Canola Variety Trial. Dep. Rep. Kansas Agric. Exp. Stn., Manhattan.

Rife, C.L., D.L. Auld, H.D. Sunderman, W.F. Heer, D.D. Baltensperger, L.A. Nelson, D.L. Johnson, D. Bordovsky, and H.C. Minor. 2000. Registration of 'Plainsman' rapeseed. Crop Sci. 40: 292–294.

Rife, C.L., D.L. Auld, H.D. Sunderman, W.F. Heer, D.D. Baltensperger, L.A. Nelson, D.L. Johnson, D. Bordovsky, and H.C. Minor. 2001a. Registration of 'Wichita' rapeseed. Crop Sci. 41:263–264.

Rife, C., W. Heer, K. Janssen, J. Long, P. Evans, R. Aiken, M. Witt, D. Auld, R. Bacon, D. Baltensperger, B. Beans, U. Bishnoi, H. Bhardwaj, D. Bordovsky, E. Christmas, L. Copeland, R. Ivy, D. Johnson, J. Kelly, C. Morris, L. Nelson, P. Raymer, R. Saunders, M. Schmidt, D. Starner, and W. Weibold. 2001b. 2000 National Winter Canola Variety Trial. Dep. Rep. Kansas Agric. Exp. Stn., Manhattan.

C.L. Rife, Dep. of Agronomy, Kansas State Univ., Manhattan, KS 66506; D.L. Auld, Dep. of Plant and Soil Science, Texas Tech Univ., Lubbock, TX 79409; H.C. Minor, Dep. of Agronomy, Univ. of Missouri, Columbia, MO 65211 (retired); W.F. Heer, South Central Exp. Field, Kansas State Univ., Hutchinson, KS 67501; D.D. Baltensperger, Dep. of Agronomy, Univ. of Nebraska, Panhandle Res.-Ext. Ctr., Scottsbluff, NE 69361; L.A. Nelson, Dep. of Agronomy, Univ. of Nebraska-Lincoln, Lincoln, NE 68583; and D. Bordovsky, Texas A&M Univ., Ag. Res.-Ext. Ctr., Vernon, TX, 76384. Registration by CSSA. Accepted 30 April 2003. *Corresponding author, (crife@oznet.ksu.edu).

Published in Crop Sci. 43:2306–2307 (2003).

Registration of 'Seahawk' Navy Bean

'Seahawk' navy bean (*Phaseolus vulgaris* L.) (Reg. no. CV-210, PI 633036) was developed and released cooperatively by the Michigan Agricultural Experiment Station and the USDA-ARS in 2003 as a high-yielding, midseason, cultivar possessing tolerance to white mold [caused by *Sclerotinia sclerotiorum* (Lib.) de Bary] and excellent canning quality.

Seahawk, tested as N97774, was derived from a cross made in 1994 between navy bean cultivars Bunsi (Tu and Beversdorf, 1982) and Huron (Kelly et al., 1994). Bunsi, also known as 'Ex-Rico 23' in Canada, is a white mold tolerant, mid-season, commercial navy bean cultivar with a semiprostrate indeterminate growth habit that exhibits a persistent green stem at maturity. Huron is a white mold tolerant, early-season, short erect indeterminate commercial navy bean cultivar with excellent canning quality. The cross was made to combine diverse sources of resistance to white mold in navy bean (Kolkman and Kelly, 2002). The F_1 plants were advanced in the greenhouse and space-planted in an F_2 nursery at the Saginaw Valley Bean and Sugarbeet Research Farm near Saginaw, MI. A single-plant F_2 selection was identified as possessing the desired agronomic and navy seed traits. The F_3 progeny row was planted at the University of Puerto Rico Research Station at Isabela, PR, and mass selected on the basis of agronomic and seed traits. A single-plant selection was made in a space-planted $F_{4:5}$ nursery in Michigan on the basis of agronomic and navy bean seed traits. The F_5 progeny row was advanced at Isabela, PR, and the reaction to virus was confirmed by inoculating remnant seed with *Bean common mosaic necrosis virus* (BCMNV, strain NL 3). The $F_{4:6}$ breeding line, coded N97774, entered replicated yield trials in 1997.

Seahawk was tested extensively for yield and agronomic traits at 31 locations in Michigan over six seasons (1997–2002). Seahawk averaged 3100 kg ha[1] and was equivalent in yield to navy bean cultivars Vista and Schooner, and Crestwood over a number of common test sites ranging from 12 to 23 locations. Seahawk outyielded the commercial navy bean cultivars (Mayflower, Mackinac, Avanti, and Navigator) by a margin ranging from 5 to 11% over a number of common locations ranging from 9 to 18. Seahawk demonstrated similar yield superiority among navy bean cultivars entered in the National Cooperative Nurseries grown at eight locations in North America in 2002.

Seahawk averages 46 cm in height and exhibits a Type IIb indeterminate growth habit, with moderate tolerance to lodging. Seahawk has white flowers and blooms 45 d after planting. Seahawk is a midseason bean, maturing 97 d after planting, and has a range in maturity from 90 to 101 d, depending on season and location. Seahawk matures similar to Schooner and 3 d earlier than Vista and Mayflower (Kelly et al., 1989). Plants of Seahawk mature uniformly and show excellent dry-down across a broad range of environments.

Seahawk carries the single dominant hypersensitive *I* gene for resistance to *Beancommon mosaic virus* (BCMV), but is sensitive to the temperature-insensitive necrosis-inducing strains of BCMNV such as NL 3 and NL 8. Seahawk carries the *Co-2* gene, which conditions resistance to Races 7 and 65 of bean anthracnose [caused by *Colletotrichum lindemuthianum* (Sacc. & Magnus) Lams. - Scrib.]. Seahawk is susceptible to common bacterial blight [caused by *Xanthomonas axonopodis* pv. *phaseoli* (Smith) Dye] and is susceptible to bean rust [caused by *Uromyces appendiculatus* (Pers.:Pers.) Unger] races 38, 39, 40, 41, 43, and 53 that occur occasionally in Michigan. Seahawk is tolerant to white mold and has demonstrated the highest level of tolerance to white mold among commercial navy bean cultivars grown in Michigan. In 4 yr of comparative field testing, Seahawk exhibited significantly more tolerance (Disease Incidence = 33%) to white mold than Vista (Disease Incidence = 48%).

Seahawk has a large white navy bean seed, which averages 24.6 g 100 seed^{-1} (range: 23–27g 100 seed^{-1}). The seed is slightly larger in size and lighter in color than other navy bean cultivars. In canning trials, Seahawk was subjectively rated by a team of panelists as having acceptable canning quality for navy beans. In 12 trials, Seahawk scored 3.8 on a seven-point hedonic scale (where 7 is most desirable, 1 is least desirable, and 4 is neither desirable or undesirable), and was equivalent to Schooner but had significantly better canning quality than Vista and Mayflower, which scored 3.1 and 2.8, respectively. The canning quality evaluation is based on whole-bean integrity (no splitting or clumping), uniformity of size (uniform water uptake), color (color retention), and brine free from starch extrusion into the canning liquid. After it is processed, Seahawk does not differ significantly from other commercial navy bean cultivars for hydration, and drained weight ratios, but exhibits a firmer texture than Vista and a lighter cooked color as determined on the L-scale of a Hunter Color Difference Meter.

Seahawk navy bean has been released as a public nonexclusive cultivar, with the option that Seahawk may be sold for seed by name only under the Certified class. A research fee will be assessed on each hundredweight unit of Foundation seed sold. Breeder seed is maintained by the Michigan Agricultural Experiment Station, East Lansing, MI 48824, in cooperation with the Michigan Crop Improvement Association.

J.D. Kelly,* G.L. Hosfield, G.V. Varner,
M.A. Uebersax, M. Ender, and J. Taylor

References

Tu, J.C., and W.D. Beversdorf. 1982. Tolerance to white mold (*Sclerotinia sclerotiorum* (Lib.) De Bary) in Ex Rico 23, a cultivar of white bean (*Phaseolus vulgaris* L.). Can. J. Plant Sci. 62:65–69.

Kelly, J.D., M.W. Adams, A.W. Saettler, G.L. Hosfield, G.V. Varner, J.S. Beaver, and M.A. Uebersax. 1989. Registration of 'Mayflower' navy bean. Crop Sci. 29:1571.

Kelly, J.D., G.L. Hosfield, G.V. Varner, M.A. Uebersax, M.E. Brothers, and J. Taylor. 1994. Registration of 'Huron' navy bean. Crop Sci. 34:1408–1409.

Kolkman, J.M., and J.D. Kelly. 2002. Agronomic traits affecting resistance to white mold in common bean. Crop Sci. 42:693–699.

J.D. Kelly, M. Ender, and J. Taylor, Dep. of Crop and Soil Sciences, and M.A. Uebersax, Dep. of Food Science and Human Nutrition, Michigan State Univ., East Lansing, MI 48824; M. Ender is sponsored by CAPES-Brazil; G.L. Hosfield, Sugarbeet and Bean Res., USDA-ARS, East Lansing, MI 48824; and G.V. Varner, Mich. Dry Bean Production Res. Advisory Board, 3066 S. Thomas Rd., Saginaw, MI 48603. Research supported by Michigan Foundation Seed Assoc., Michigan Dry Bean Prod. Res. Adv. Board, Michigan Agric. Exp. Stn., and the USDA-ARS. Joint contribution of the Michigan Agric. Exp. Stn. and USDA-ARS. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (kellyj@msu.edu).

Published in Crop Sci. 43:2307–2308 (2003).

Registration of 'Quick Trans' Perennial Ryegrass

'Quick Trans' perennial ryegrass (*Lolium perenne* L.) (Reg. no. CV-227, PI 628342) was released by Pure Seed Testing, Inc., Hubbard, OR, in 1999. Quick Trans is an advanced generation synthetic cultivar selected from the progenies of five perennial ryegrass plants that were crossed with four annual ryegrass (*L. multiflorum* Lam.) plants during the spring of 1997. The first Certified seed was produced in 2001. Quick Trans was tested under the experimental designation PST-3BK.

During the spring of 1997, five early-maturing, dark-green perennial ryegrass plants were selected from population PST-2KS near Hubbard. Three of these plants traced their origin to 'Roadrunner', and two traced their origin to 'Quickstart' (Alderson and Sharp, 1994). Four annual ryegrass plants found as contaminants in a 'Kentucky 31' tall fescue (*Festuca arundinacea* Schreb.) seed yield trial plot were also selected. These nine plants were transplanted to a greenhouse polycross near Hubbard, designated 3AK. The plants interpollinated, and seed was subsequently harvested from each plant during the summer of 1997.

Seed harvested from the 3AK polycross was used to establish an isolated 1050-plant nursery near Hubbard during the fall of 1997. During the spring of 1998, 23 plants with perennial growth habit, early maturity, dark color, and freedom from crown rust (caused by *Puccinia coronata* Corda) and stem rust (caused by *P. graminis* Pers.:Pers.) were selected before anthesis from this nursery. These 23 plants, which traced maternally to the five plants selected from the PST-2KS population, were transplanted to an isolated crossing block, designated PST-3BK, near Hubbard. The plants interpollinated, and seed was subsequently harvested during the summer of 1998.

During the fall of 1998, seed from the 23 plants in the PST-

3BK polycross was used to establish an isolated 3450-spaced-plant nursery near Hubbard. During the spring of 1999, plants were removed from this nursery before anthesis to increase uniformity of plant type and maturity. Selection criteria for the remaining plants were early maturity, dark-green color, freedom from stem rust and crown rust and high percentage of reproductive tillers. The remaining plants interpollinated, and seed was subsequently harvested from 875 plants during the summer of 1999 to produce the first Breeder seed of Quick Trans.

Quick Trans is a very early-maturing, dark-green perennial ryegrass cultivar that is recommended for turf. It has an initial heading date 5 to 21 d earlier than most other perennial ryegrasses. Quick Trans has an inherent 0% fluorescence level of seedling roots. Quick Trans has high resistance to stem rust, good resistance to crown rust, and moderate resistance to red thread [caused by *Laetisaria fuciformis* (McAlpine) Burdsall]. Quick Trans has shown early spring transition and good turf quality in winter overseeding turf trials (Morris, 2000, 2001) and is recommended for the winter overseeding of bermudagrass (*Cynodon* L. Rich spp.). In overseeding trials, Quick Trans has performed well as a monostand and in mixtures with 5 to 10% crested dogtail (*Cynosurus cristatus* L.). In temperate areas, Quick Trans should persist as permanent turf and perform well as a monostand, in blends with other perennial ryegrasses, or in mixtures with Kentucky bluegrass (*Poa pratensis* L.) or fine-leaved fescues (*Festuca* L. spp.). Quick Trans is recommended for sports turfs and lawns in areas where perennial ryegrass is adapted.

Seed production of Quick Trans is limited to three generations of increase from Breeder seed: one each of Foundation, Registered, and Certified. Pure Seed Testing, Inc. maintains Breeder seed in Oregon and has applied for U.S. Plant Variety Protection (PVP application no. 200200003).

C.A. Rose-Fricker, M.L. Fraser,* and J.K. Wipff

References

Alderson, J., and W.C. Sharp. 1994. Grass varieties in the United States. Agric. Handb. No. 170. USDA-SCS. U.S. Gov. Print. Office, Washington, DC.

Morris, K.N. 2000. On-site testing of grasses for overseeding of bermudagrass fairways. Progress report 1999–2000. NTEP No. 00–13. National Turfgrass Evaluation Program. USDA-ARS. Beltsville, MD 20705.

Morris, K.N. 2001. On-site testing of grasses for overseeding of bermudagrass fairways. Progress report 2000–2001. NTEP No. 01–20. National Turfgrass Evaluation Program. USDA-ARS. Beltsville, MD 20705.

C.A. Rose-Fricker and J.K. Wipff, Pure Seed Testing, Inc., P.O. Box 449, Hubbard, OR 97032; M.L. Fraser, Pure Seed Testing, P.O. Box 176, Rolesville, NC 27571. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (mlkfraser@aol.com).

Published in Crop Sci. 43:2308–2309 (2003).

Registration of 'Brightstar SLT' Perennial Ryegrass

'Brightstar SLT' perennial ryegrass (*Lolium perenne* L.) (Reg. no. CV-226, PI 628341) was released by Pure Seed Testing, Inc., Hubbard, OR, in 1999. Pure Seed Testing, Inc. developed Brightstar SLT by intercrossing plants from three perennial ryegrass populations during the spring of 1999. The first Certified seed was produced in 2001. Brightstar SLT was tested under the experimental designation PST-2A6B.

Pure Seed Testing, Inc. developed the three populations used in the breeding of Brightstar SLT. The first population was comprised of 1000 plants from 'Brightstar II' (Rose-Fricker et al., 2002a) that were selected as seedlings that germinated in a greenhouse salt bath at 15 g L^{-1} NaCl. This population was designated Brightstar II salt germination.

The second population was designated 2FXX Brightstar II. This population was derived from a polycross of 21 plants selected from Brightstar II, 21 plants selected from 'Charger II', 12 plants selected from 'Chaparral', 11 plants selected from 'Catalina' (Rose-Fricker et al., 2002b) and six plants selected from 'Roadrunner'. These 71 plants were selected from Foundation seed plantings in the Oregon Willamette Valley. Plants were selected for dark color, high crown density, high seed production, and resistance to crown rust (caused by *Puccinia coronata* Corda) and stem rust (caused by *P. graminis* Pers.:Pers.) during the spring of 1998. These 71 plants were transplanted into an isolated polycross nursery near Hubbard and allowed to interpollinate during the summer of 1998. Seed was harvested from the 21 Brightstar II plants, bulked, and designated 2FXX Brightstar II.

The third population used in the development of Brightstar SLT was designated 2A6E and was selected for early maturity, upright growth habit, dark color and stem rust resistance. This population was developed using A96 sources from the New Jersey Agricultural Experiment Station of Rutgers University and was not related to the populations described above. During the spring of 1997, 28 plants from 15 A96 sources were selected and placed into an isolated polycross near Hubbard. In July 1997, 20 of these plants were removed from the polycross based on high susceptibility to stem rust. The eight remaining plants were from the following sources: A96-306 (2 plants), A96-315 (2 plants), A96-316 (2 plants), A96-317 (1 plant), and A96-333 (1 plant). These plants were allowed to interpollinate during the summer 1998, and seed was subsequently harvested from each plant. A96-306 traced its maternal origin to a plant collected at 4 Delaware Drive, East Brunswick, NJ. A96-315, A96-316, and A96-317 traced their maternal ancestries to a plant that was collected from the Rutgers University Golf Course, Piscataway, NJ, in 1991 and contained a fungal endophyte (*Neotyphodium lolii* Latch, Christensen & Samuels). A96-333 traced its maternal origin to plant PR92-210 from Rutgers.

During the fall of 1998, seed from the three populations described above were used to establish an isolated 5650-spaced-plant nursery, designated 2A6B, near Hubbard. Seedlings from these populations were planted in alternating rows of Brightstar II salt germination (1000 plants), 2FXX Brightstar II (2250 plants), and 2A6E (2400 plants). The nursery was rogued for uniformity of plant type and maturity before anthesis, and the remaining plants were allowed to interpollinate. Seed was subsequently harvested from 841 plants to produce the first Breeder seed of Brightstar SLT during the summer of 1999. Of these plants, 398 traced their origin to 2FXX Brightstar II, 293 traced their origin to 2A6E, and 150 traced their origin to Brightstar II salt germination.

Brightstar SLT has shown good turf quality in turf trials throughout the USA (Morris, 2001, 2002) and is recommended for lawns and sports fields in temperate regions. Brightstar SLT has good resistance to stem rust and crown rust and moderate resistance to red thread [caused by *Laetisaria fuciformis* (McAlpine) Burdsall] and dollar spot (caused by *Sclerotinia homoeocarpa* F.T. Bennett). In a greenhouse salt tolerance study, 84% of Brightstar SLT mature plants survived for 9 wk at 17 g L^{-1} NaCl (Rose-Fricker and Wipff, 2001). Brightstar SLT has shown good turf quality in winter overseeding trials and is recommended for winter overseeding of bermudagrass (*Cynodon* L. Rich spp.). Brightstar SLT is taller than Brightstar II and has shown better salt tolerance in greenhouse tests.

Seed propagation of Brightstar SLT is limited to three generations of increase from Breeder seed: one each of Foundation, Registered, and Certified. Pure Seed Testing, Inc. maintains Breeder seed in Oregon and has applied for U.S. Plant Variety Protection (PVP application no. 200200002.).

C.A. ROSE-FRICKER, M.L. FRASER,* AND J.K. WIPFF

References

Morris, K.N. 2001. National Perennial Ryegrass Test– 1999. Progress report 2000. NTEP No. 01–1. National Turfgrass Evaluation Program. USDA-ARS. Beltsville, MD 20705.

Morris, K.N. 2002. National Perennial Ryegrass Test– 1999. Progress report 2001. NTEP No. 02–2. National Turfgrass Evaluation Program. USDA-ARS. Beltsville, MD 20705.

Rose-Fricker, C.A., M.L. Fraser, and W.A. Meyer. 2002a. Registration of 'Brightstar II' perennial ryegrass. Crop Sci. 42:662–663.

Rose-Fricker, C.A., M.L. Fraser, and W.A. Meyer. 2002b. Registration of 'Catalina' perennial ryegrass. Crop Sci. 42:2213.

Rose-Fricker, C., and J.K. Wipff. 2001. Breeding for salt tolerance in cool-season turf grasses. Int. Turfgrass Soc. Res. J. 9:206–212.

C.A. Rose-Fricker and J.K. Wipff, Pure Seed Testing, Inc., P.O. Box 449, Hubbard, OR 97032; M.L. Fraser, Pure Seed Testing, P.O. Box 176, Rolesville, NC 27571. Registration by CSSA. Accepted 30 April 2003 *Corresponding author (mlkfraser@aol.com).

Published in Crop Sci. 43:2309–2310 (2003).

Registration of 'BlueChip' Kentucky Bluegrass

'BlueChip' Kentucky bluegrass (*Poa pratensis* L.) (Reg. no. CV-71, PI 599224) is a turf-type cultivar released in August 1997 by the J.R. Simplot Co., Jacklin Seed, Post Falls, ID. Experimental designations for BlueChip were 92-1991 and MED-1991.

BlueChip was developed from a highly apomictic, single-plant selection from progeny of hybrid cross 90-0336. Pollen from breeding line 50-14 was applied in the field in June 1990 to panicles of 'Limousine' Kentucky bluegrass (Alderson and Sharp, 1994). Breeding line 50-14 originated from a collection by the late Arden Jacklin, made in the northeastern USA during the 1970's. Seed harvested from Limousine plants were sown in greenhouse flats and later transferred to a field nursery of 28 800 plants near Post Falls in June 1991. Offspring with characteristics dissimilar to Limousine were flagged during maturation in spring of 1992, and plant 92-1991 was identified as being different from Limousine by its leaf texture and color before heading. A single spaced-plant of 92-1991 produced 75 g of clean seed, which was approximately five times the seed production typical for a 1-yr-old bluegrass spaced plant in northern Idaho. Seed harvested from this plant was used to establish a turf trial in September 1992 and a seed yield trial in August 1996 at Post Falls.

Spaced plants of BlueChip most closely resemble 'Baron' Kentucky bluegrass (Hurley and Ghijsen, 1980), although BlueChip has no Baron in its background. BlueChip seedheads have excellent floret fertility and very large seed, averaging 2 000 000 seeds kg^{-1}. Panicle color of BlueChip at pollination appears more purplish than Baron. BlueChip also has darker green foliage than Baron. In spaced-plant nurseries, BlueChip averages 90% apomictic plants, but varies depending on weather and growing conditions. Aberrant progeny are rogued from seedstock fields to ensure continued uniformity and stability, but they will continue to occur in every generation. In 8 yr of commercial seed production, BlueChip has produced high yields of quality seed, with freedom from ergot honeydew and sclerotia [caused by *Claviceps purpurea* (Fr.) Tul.], and no adverse reactions to labeled Kentucky bluegrass pesticides.

BlueChip was tested in the National Turfgrass Evaluation Program (NTEP) medium-high maintenance trial, established in 1995 (Morris, 2001), where it demonstrated good wear and frost tolerance, and a dark green autumn color. BlueChip showed good resistance to Microdochium patch {caused by *Microdochium nivale* (Fr.) Samuels and Hallett [teleomorph: *Monographella nivalis* (Schaf) E. Muller]}, spring melting out [caused by *Drechslera poae* (Baudys) Shoem], seedling damping off (caused by *Pythium*, *Rhizoctonia*, and *Fusarium* spp.), and chinch bug (*Blissus leucopterus hirtus* Montandon). BlueChip had moderately good resistance to gray snow mold (caused by *Typhula idahoensis* Remsberg), stem rust (caused by *Puccinia graminis* Pers.:Pers.), and billbug (*Sphenophorus* spp.).

BlueChip is recommended for lawns, golf courses, parks, and sports turf in areas where Kentucky bluegrass is well adapted for turf. It can be grown in full sun or some shade. BlueChip is compatible in blends and mixtures with other cool-season turfgrasses.

Breeder seed, first harvested in 1995, is maintained by Simplot/Jacklin Seed. Propagation is limited to four cycles of seed increase: Breeders, Foundation, Registered, and Certified. U.S. Plant Variety Protection application no. 9700384 has been filed for BlueChip.

A.D. BREDE*

References

Alderson, J., and W.C. Sharp. 1994. Grass varieties in the United States. Agric. Handb. 170. USDA-SCS. U.S. Gov. Print. Office, Washington, DC.

Hurley, R.H., and H. Ghijsen. 1980. Registration of 'Baron' Kentucky bluegrass. Crop Sci. 20:549.

Morris, K.N. 2001. National Kentucky bluegrass test 1995– medium-high maintenance. Final report. NTEP no. 01–12. National Turfgrass Evaluation Program. USDA-ARS, Beltsville, MD.

Simplot/Jacklin Seed, West 5300 Riverbend Ave., Post Falls, ID 83854-9499. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (dbrede@simplot.com).

Published in Crop Sci. 43:2310 (2003).

Registration of 'BlueMoon' Kentucky Bluegrass

'BlueMoon' Kentucky bluegrass (*Poa pratensis* L.) (Reg. no. CV-73, PI 632627) is a turf-type cultivar released in August 1998 by the J.R. Simplot Co., Jacklin Seed, Post Falls, ID. Experimental designation for BlueMoon was 91-1580.

BlueMoon originated from a highly apomictic, single-plant selection from hybrid cross 89-1037. Pollen from 'Midnight' (Meyer et al., 1984) was applied to panicles of 'Limousine' (Alderson and Sharp, 1994) in the field at Post Falls in July 1989. Seed harvested from Limousine mother plants were individually sown into cells of greenhouse flats during the spring of 1990 and later transplanted to a spaced-plant field nursery of 33 500 plants. Offspring with characteristics dissimilar to Limousine and Midnight were flagged during maturation in the spring of 1991. Plant number 91-1580 differed from Limousine by its panicle color and shape. It produced 25 g of seed, which is more than typical for a Kentucky bluegrass spaced plant in northern Idaho. Seed from this plant was used to establish a turf trial in September 1991 and a replicated seed yield trial in August 1993, near Post Falls.

In seed production, BlueMoon appears most similar to 'NuGlade' (PI 599221), which was developed from the same cross (Brede, 2001). At maturity, panicles of BlueMoon appear more brownish red than panicles of NuGlade. It also has shorter culm length, shorter internode length below the panicle, and a later reproductive maturity than NuGlade.

Progeny trials, conducted in a 1996 spaced-plant nursery, determined that the level of apomixis of BlueMoon was 90%, but this may vary depending on weather and growing conditions. A survey of 1480 plants of BlueMoon showed that 8.3% of plants were variants in the vegetative (preflowering) stage, 1.1% were heading maturity variants, 0.1% seedhead variants, and 1.1% were miniature plants. BlueMoon appears to be slightly less apomictic than NuGlade. Approximately half of BlueMoon variants are a lighter green, taller-growing plant of "common-type" appearance. Other variants appear similar to the majority plant form but have a shorter culm and lighter green panicles. Aberrant progeny are rogued from seedstock fields to ensure continued uniformity and stability, but they will continue to occur in every generation. In 7 yr of commercial seed production, BlueMoon has demonstrated the potential for high yields of quality seed, relative freedom from ergot [caused by *Claviceps purpurea* (Fr.) Tul.], and no adverse reactions to labeled Kentucky bluegrass pesticides.

BlueMoon has been tested in turf trials at Rutgers University where it produced turf quality similar to that of NuGlade. In one 2-yr trial, it ranked seventh in quality out of 100 cultivars (Bonos et al., 2001).

BlueMoon is recommended for golf course tees, fairways, and roughs, and for lawns, parks, and sports turf, in full sun or some shade, in areas where Kentucky bluegrass is well adapted for turf. It is compatible in blends and mixtures with other cool-season turfgrasses at mowing heights as low as 13 mm.

Breeder seed, first harvested in 1996, is maintained by Simplot/Jacklin Seed. Seed propagation is limited to one generation of increase for Foundation, Registered, and Certified seed. U.S. Plant Variety Protection was not requested for BlueMoon.

A.D. Brede*

References

Alderson, J., and W.C. Sharp. 1994. Grass varieties in the United States. Agric. Handb. 170. USDA-SCS. U.S. Gov. Print. Office, Washington, DC.

Bonos, S.A., J.A. Murphy, W.A. Meyer, C.R. Funk, W.K. Dickson, E. Watkins, R.F. Bara, D.A. Smith, and M.M. Mohr. 2001. Performance of Kentucky bluegrass cultivars and selections in New Jersey turf trials. p. 53–103. *In* A.B. Gould (ed.) Rutgers Turfgrass Proc. Vol. 33, New Jersey Agric. Exp. Stn., New Brunswick, NJ.

Brede, A.D. 2001. Registration of 'NuGlade' Kentucky bluegrass. Crop Sci. 41:584–585.

Meyer, W.A., B.L. Rose, J.M. Johnson-Cicalese, and C.R. Funk. 1984. Registration of 'Midnight' Kentucky bluegrass. Crop Sci. 24:822–823.

Simplot/Jacklin Seed, West 5300 Riverbend Ave., Post Falls, ID 83854-9499. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (dbrede@simplot.com).

Published in Crop Sci. 43:2310–2311 (2003).

Registration of 'Impact' Kentucky Bluegrass

'Impact' Kentucky bluegrass (*Poa pratensis* L.) (Reg. no. CV-72, PI 599225) is a turf-type cultivar released in August 1996 by the J.R. Simplot Co., Jacklin Seed, Post Falls, ID. Experimental designations for Impact were 91-1576 and J-1576.

Impact originated from a highly apomictic, single-plant selection from hybrid cross 89-1037, made in the field at Post Falls in July 1989 with pollen from 'Midnight' (Meyer et al., 1984) used to pollinate plants of 'Limousine' (Alderson and Sharp, 1994). Seeds harvested from Limousine mother-plants were individually sown into cells of greenhouse flats during the spring of 1990 and later transplanted to a spaced-plant field nursery of 33 500 plants. Offspring with characteristics dissimilar to Limousine were flagged during maturation in the spring of 1991. Plant number 91-1576 differed from Limousine by its foliar characteristics before seedhead expression. It produced 28 g of seed, which is approximately double that for a typical Kentucky bluegrass spaced plant in northern Idaho. Seed harvested from this plant was used to establish a turf trial in September 1991, a replicated seed yield trial in August 1992, and a Plant Variety Protection (PVP) trial in June 1994, near Post Falls.

Impact is most similar to 'Quantum Leap' (PI 603096), which was developed from the same cross. It can be differentiated from Quantum Leap based on seven botanical traits, as recorded in the United States PVP application for Impact. These traits include longer culm length, longer panicle length, longer flag leaf length, and earlier reproductive maturity in seed production.

Progeny trials, conducted in a 1995 spaced-plant nursery, determined that the mean spaced-plant apomixis rate of Impact was 95%, but this may vary depending on weather and growing conditions. A survey of 1560 plants of Impact showed that 1.5% of plants were variants in the vegetative (pre-flowering) stage, 1.5% were heading maturity variants, 0.6% seedhead variants, 0.4% miniature plants, and 1% were headless plants. Very few of the variants were evident before the heading stage of maturation. Most were evident at heading and during anthesis. In general, variants were later in maturity with a shorter culm length than the majority plant form. Approximately 0.5% of plants exhibited a "common-type" growth habit, with culms extending approximately 20 cm above the majority.

Impact ranked fifth in overall turf quality out of 173 entries in the 2000 National Turfgrass Evaluation Program (NTEP) Kentucky bluegrass trial (Morris, 2002). It ranked third for quality at close mowing (less than 2.5-cm-mowing height), eleventh at 2.5- to 5-cm mowing, twelfth at 5 to 7.5-cm-mowing height, and second at >7.5-cm-mowing height with no irrigation. Impact ranked sixth in turfgrass quality across the Northeastern region [MA, ME, NJ (2 locations), NY, PA, and RI], first in the Great Plains region [KS, NE (2 locations), OK, and SD], and first in the Mountain West region (CO, UT, and WA). It exhibited dark green genetic color, good seedling vigor, high density in spring and summer, good resistance to leaf spot [caused by *Drechslera poae* (Baudys) Shoem], and little *Poa annua* L. encroachment. Impact was also tested in the 1995 to 1999 medium-high maintenance NTEP trial, where it ranked ninth out of 103 entries for turf quality (Morris, 2001).

In 8 yr of commercial seed production, Impact has demonstrated the potential for high yields of quality seed, relative freedom from ergot [caused by *Claviceps purpurea* (Fr.) Tul.], and no adverse reactions to labeled Kentucky bluegrass pesticides.

Impact is recommended for golf course tees, fairways, and roughs, and for lawns, parks, and sports turf, in full sun or some shade, in areas where Kentucky bluegrass is well adapted for turf. It is compatible in blends and mixtures with other cool-season turfgrasses at mowing heights as low as 13 mm.

Breeder seed, first harvested in 1995, is maintained by Simplot/Jacklin Seed. Seed propagation is limited to one generation of increase for Foundation, Registered, and Certified seed. U.S. Plant Variety Protection application no. 9700385 has been filed for Impact.

A.D. Brede*

References

Alderson, J., and W.C. Sharp. 1994. Grass varieties in the United States. Agric. Handb. 170. USDA-SCS. U.S. Gov. Print. Office, Washington, DC.

Meyer, W.A., B.L. Rose, J.M. Johnson-Cicalese, and C.R. Funk. 1984. Registration of 'Midnight' Kentucky bluegrass. Crop Sci. 24:822–823.

Morris, K.N. 2002. National Kentucky bluegrass test 2000. NTEP Progress Report no. 02–1. National Turfgrass Evaluation Program. USDA-ARS, Beltsville, MD.

Morris, K.N. 2001. National Kentucky bluegrass test 1995– medium-high maintenance. Final report. NTEP no. 01–12. National Turfgrass Evaluation Program. USDA-ARS, Beltsville, MD.

Simplot/Jacklin Seed, West 5300 Riverbend Ave., Post Falls, ID 83854-9499. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (dbrede@simplot.com).

Published in Crop Sci. 43:2311–2312 (2003).

REGISTRATIONS OF GERMPLASM

Registration of RN583 Sorghum Germplasm Line

RN583 sorghum [*Sorghum bicolor* (L.) Moench] germplasm line (Reg. no. GP-609, PI 632253) was developed jointly by the USDA-ARS and the Agricultural Research Division, Institute of Agriculture and Natural Resources, University of Nebraska, and was released in June 2002.

RN583 sorghum germplasm is a S_8 selection from the low hydrocyanic acid (HCN)-potential population NP36 (Gorz et al., 1990b). RN583 exhibited long panicles and produced significantly higher grain yields than the low HCN-potential check N97 (Gorz et al., 1990a) when grown at Ithaca, NE in 1998 and 2000. Seedling hydrocyanic acid (HCN) content of RN583 varied from 0.170 to 1.248 mg g^{-1} in three separate greenhouse experiments. Within individual experiments HCN content of RN583 was equivalent to the HCN content of N97, and was approximately one-half the HCN content of Redlan or RTx430 (Miller, 1984). RN583 has purple necrotic plant color, white seed, restores fertility in A1 cytoplasm, and does not have a pigmented testa. RN583 averaged 137 cm in height at Ithaca, NE, and produced hybrids 135 cm in height when crossed to ACK60. Average time to 50% anthesis was 83 d, which was equivalent to Redlan, and 6 d earlier than RTx430. A low incidence of male-sterility probably due to *ms3* has been observed in RN583, which can be used to facilitate crossing. Reactions of RN583 to specific insects or diseases have not been determined.

RN583 is a source of low HCN-potential germplasm with improved agronomic characteristics when compared with previously released low HCN-potential R-line sorghum germplasm. RN583 has application for use in developing grain sorghum R-lines with reduced potential for HCN production in stover following grain harvest.

Seed of RN583 will be maintained and distributed by the USDA-ARS, Wheat, Sorghum, and Forage Research Unit, Department of Agronomy and Horticulture, University of Nebraska, Lincoln, Nebraska 68583-0937, and will be provided without cost to each applicant on written request. Requests from outside the USA must be accompanied by an import permit. Genetic material of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new varieties–cultivars. It is requested that appropriate recognition be made if this germplasm contributes to the development of a new breeding line or variety–cultivar.

J.F. PEDERSEN* AND J.J. TOY

References

Gorz, H.J., F.A. Haskins, and B.E. Johnson. 1990a. Registration of 15 germplasm lines of grain sorghum and sweet sorghum. Crop Sci. 30:762–763.

Gorz, H.J., F.A. Haskins, B.E. Johnson, and A. Sotomayor-Rios. 1990b. Registration of NP36 and NP37, two random-mating grain sorghum populations selected for reduced dhurrin content. Crop Sci. 30:761–762.

Miller, F.R. 1984. Registration of RTx430 sorghum parental line. Crop Sci. 24:1224.

USDA-ARS, Dep. of Agronomy, Univ. of Nebraska-Lincoln, Lincoln, NE 68583-0937. Joint contribution of the USDA-ARS and the Dep. of Agronomy, Univ. Of Nebraska-Lincoln, as Journal Series Paper No. 13853. Registration by CSSA. Accepted 31 March 2003. *Corresponding author (jfp@unlserve.unl.edu).

Published in Crop Sci. 43:2312 (2003).

Registration of Great Northern Common Bean Germplasm UI98-209G

Medium-seeded (35 g 100 seed^{-1}) great northern common bean (*Phaseolus vulgaris* L.) germplasm UI98-209G (Reg. no. GP-235, PI 632412) was developed by the dry bean breeding program at the University of Idaho and released in 2002. UI98-209G has a Type III indeterminate growth habit with semiprostrate branches and small vine (Singh, 1982). UI98-209G was released for its unique combination of the *I* and *bc-1*^{2} resistance alleles for the *Bean common mosaic virus* (BCMV) and *Bean common mosaic necrosis virus* (BCMNV).

UI98-209G was derived from the cross UI 425/BelNeb-RR-1 made in the greenhouse in the fall of 1989. The F_1 was also grown in the greenhouse in the spring of 1990. The F_2 population was planted at Kimberly Research & Extension Center, Idaho. The F_2 to F_4 were advanced, by a single-pod-descent method without selection. Twelve single plants were harvested in the F_5 and their plant-to-progeny rows were grown in the field at Kimberly in 1994. All plants in the selected row were bulk harvested, and seed increased in 1995, 1997, and 1998. UI 425 is a high yielding late maturing great northern cultivar released by the Idaho Agricultural Experiment Station in 1984 (Kolar and Hayes, 1985). It has a Type III growth habit with medium vine. UI 425 is susceptible to the US-6 and NL-3K strains of BCMV and BCMNV, respectively. Also, while UI 425 is susceptible to race 53 (Middle American) of *Uromyces appendiculatus* (Pers.: Pers.) Unger, it is resistant to race 38 (Andean). Great northern BelNeb-RR-1 with broad based BCMV and rust resistance was jointly released by the USDA-ARS, Beltsville, MD, and Nebraska Agricultural Experiment Station in 1988 (Stavely et al., 1989).

UI98-209G was tested under the experimental number 98:209G for anthracnose [caused by *Colletotrichum lindemuthianum* (Sacc. & Magnus) Lams.-Scrib.], BCMV, common bacterial blight [caused by *Xanthomonas campestris* pv. *phaseoli* (Smith) Dye], *Beet curly top virus* (BCTV) (a geminivirus), Fusarium root rot [caused by *Fusarium solani* f. sp. *phaseoli*

(Burkholder) W.C. Snyder & H.N. Hans.], halo blight [caused by *Pseudomonas syringae* pv. *phaseolicola* (Burkh.)], rust, and white mold [caused by *Sclerotinia sclerotiorum* (Lib) de Bary] between 1999 and 2002. UI98-209G was also tested under the same experimental number in preliminary (1999) and advanced (2000) replicated yield trials in Idaho, and in the Western Regional Bean Trial (WRBT) and North American Cooperative Dry Bean Nursery (CDBN) in 2001 and 2002. UI98-209G has resistance to BCTV, and bean rust races 38, 39, 40, 41, and 43 in the fields at USDA-ARS-Beltsville, MD, and races 38 and 53 in the greenhouse at Filer, ID. This germplasm has moderate resistance to halo blight, drought and soil zinc deficiency. However, it is susceptible to anthracnose, common bacterial blight, and white mold.

In comparative preliminary and advanced replicated yield trials at Kimberly and Parma in Idaho, UI98-209G averaged 2859 kg ha^{-1} compared with 3175 kg ha^{-1} for 'UI 465', and 3293 kg ha^{-1} for UI 425. In Idaho, UI98-209G matured in 90 d compared with 98 d for UI 465 and 95 d for UI 425. Mean seed yield of UI98-209G across 19 locations in North America in 2001 CDBN was 2961 kg ha^{-1} compared with 2916 kg ha^{-1} for UI 465 and 2852 kg ha^{-1} for 'Matterhorn'. Similar to Matterhorn, UI98-209G matured in an average of 91 d compared with 93 d for UI 465. UI98-209G has white flowers and its 100-seed weight is similar to that of UI 465 and Matterhorn. However, unlike truncate or fastigiate seed shape of Matterhorn and UI 465, dry seeds of UI98-209G are cuboid, and possess light yellow hilar ring.

Seed of UI98-209G will be maintained by the Idaho Agricultural experiment Station. A small quantity of seed for research purposes is available from K. Stewart-Williams, University of Idaho, Kimberly Research and Extension Center, 3608 N 3600 E, Kimberly, ID 83341. Appropriate acknowledgment of the University of Idaho in its use is highly appreciated.

K.D. Stewart-Williams, J.R. Myers, M.F. Dennis, R. Hayes, C. Strausbaugh, and S.P. Singh*

References

Singh, S.P. 1982. A key for identification of different growth habits of *Phaseolus vulgaris* L. Annu. Rpt. Bean Improv. Coop. 25:92–95.

Kolar, J.J., and R. Hayes. 1985. Naming and release of a new cultivar of great northern beans UI 425. Annu. Rpt. Bean Improv. Coop. 28:138–139.

Stavely, J.R., J.R. Steadman, D.P. Coyne, and D.T. Lindgren. 1989. BelNeb rust resistant-1 and -2 great northern dry bean germplasm. HortScience 24:400–401.

K. Stewart-Williams, M. Dennis, R. Hayes, C. Strausbaugh, and S. Singh, Univ. of Idaho, Kimberly Research & Extension Center, 3793 North 3600 East, Kimberly, ID 83341; J. Myers, Dep. of Horticulture, ALS 4017, Oregon State Univ., Corvallis, OR 97331. We thank Phillip Miklas, Marcial Pastor-Corrales, and David Webster for their help with some disease evaluations. Idaho Agric. Exp. Stn. Journal Article No. 03703. Registration by CSSA. Accepted 31 March 2003. *Corresponding author (singh@kimberly.uidaho.edu).

Published in Crop Sci. 63:2312–2313 (2003).

Registration of Five Oilseed Maintainer (HA 429–HA 433) Sunflower Germplasm Lines

Five oilseed sunflower (*Helianthus annuus* L.) maintainer germplasms were developed and released by the USDA-ARS, Fargo, ND, and the North Dakota Agricultural Experiment Station, Fargo, ND, in 2001: HA 429 (Reg. no. GP-266, PI 632338); HA 430 (Reg. no. GP-267, PI 632339); HA 431 (Reg. no. GP-268, PI 632340); HA 432 (Reg. no. GP-269, PI 632341); and HA 433 (Reg. no. GP-270, PI 632342). HA 429 and HA 430 were derived from crosses of cultivated sunflower with *Helianthus paradoxus* Heiser accessions, and were selected for tolerance to soil salinity. HA 431, HA 432, and HA 433 provide increased genetic diversity for agronomic, morphologic, and oil content characteristics in the development of hybrids, parental lines, or improved germplasms.

HA 429 and HA 430 are BC_1F_7-derived BC_1F_8 oilseed maintainer germplasm lines advanced by pedigree selection from the cross HA 821*2//cmsHA 89*2/*Helianthus paradoxus* (PAR 1673-1). HA 821 (PI 599984) was released by the USDA-ARS in 1986 (Roath et al. 1986). PAR 1673-1 (PI 539899) was derived from a cross made in 1989 between cmsHA 89 and a wild accession of *Helianthus paradoxus* Heiser (PI 468802) collected near Fort Stockton, TX, in a habitat with saline soil conditions (Seiler, 1991). Seed of PAR-1673-1 was planted in 10-cm-tall paper cups containing 150 mL of sandy loam soil (0.115 Sm^{-1}). The seedlings were watered with distilled water until the first pair of true leaves reached 2.5 cm in length. After this stage, the seedlings were watered with a 15 g L^{-1} NaCl (2.470 Sm^{-1}) salt solution. Approximately 15 mL of the solution was applied each day. After 14 d, seedlings with nearly normal growth, normal leaves, and limited stunting were transplanted to pots containing sandy loam soil and were watered with distilled water. Plants of the check germplasm line, HA 821, were severely stunted and had necrotic leaves and dying meristematic tissue after 14 d of treatment. Pollen was collected from the salt tolerant plants and crossed to HA 821. F_1 plants were treated with the same salt solution protocol and pollen from tolerant plants was collected to backcross to HA 821. The BC_1F_1 and BC_1F_2 plants were screened using the salt solution protocol described above and the tolerant BC_1F_2 plants transplanted and allowed to self-pollinate. Selections in the BC_1F_3 through the BC_1F_8 generations were made for height, stalk quality, self-fertility, and tolerance to excess water conditions as lines and in hybrid combinations. The pedigree breeding method was utilized from the BC_1F_3 through the BC_1F_8 generations to select lines in the breeding nursery located at Fargo, ND, during the 1994 to 1999 summer seasons. Plant stress from excess water was a selection criterion in 1996 and 1997. Height of HA 429 and HA 430 was 137 and 142 cm, respectively, compared with 143-cm height of the USDA line HA 406 (Miller and Gulya, 1997). HA 430 had more tolerance to Phomopsis (caused by *Phomopsis helianthi* Munt.-Cvet. et al.) than HA 429 in lines and in their hybrids.

HA 431 is an F_7-derived F_8 oilseed maintainer germplasm line selected from the cross HA 821/Argentina Pergamino Population. The Argentina Pergamino Population was obtained from Ing. Agr. Pedro Luduena, Sunflower Research Project, Nacional de Tecnologia Agropecuaria (INTA), Pergamino, Argentina, in 1990. HA 432 is an F_7-derived F_8 oilseed maintainer germplasm line selected from the cross HA 821/France B-line Bulk. The France B-line Bulk was a collection of pollen from the lines CAL, CAN, RC, and ZH, obtained from Dr. Felicity Vear, Institut National de la Recherche Agronomique (INRA), Station d'Amelioration des Plantes, Clermont-Ferrand, France. HA 433 is an F_7-derived F_8 oilseed maintainer germplasm line selected from the cross UC/HA 383. HA 383 (PI 578872) was released by the USDA-ARS in 1992 (Miller and Gulya, 1995). UC is a maintainer oilseed line obtained from Dr. Felicity Vear, Institut National de la Recherche Agronomique (INRA), Station d'Amelioration des Plantes, Clermont-Ferrand, France. The pedigree breeding method was utilized from the F_4 to the F_8 generations to select lines in the breeding nursery located at Fargo, ND, during 1995 to 1999 summer seasons. Selections were made for height, stalk quality, and self-fertility in lines. Height of HA 431, HA 432, and HA 433 was 152, 155, and 135 cm, respectively, compared with 143 cm height of the USDA line HA 406. HA 431 has a drooping head and long neck, whereas HA 432 and HA 433 have more upright heads. HA 431 and HA 432 had excellent tolerance to Phomopsis.

Hybrids with the cytoplasmic male-sterile equivalents of HA 429, HA 430, HA 431, HA 432, and HA 433 were produced by pollinating with two restorer lines, RHA 373 (PI 560141) and RHA 377 (PI 560145). These hybrids were compared with the commercial hybrids Pioneer 6451, Croplan Genetics 803, Cargill 187, NK 231, and DK 3790 in 1997, 1998, and 1999 trials planted at Casselton, ND. Yield of hybrids with HA 429, HA 430, HA 431, HA 432, and HA 433 was 2955, 3031, 3055, 2851, and 2988 kg ha^{-1}, respectively, compared with the 2802 kg ha^{-1} average of the five check hybrids. Oil content of hybrids with HA 429, HA 430, HA 431, HA 432, and HA 433 was 472, 496, 475, 459, and 456 g kg^{-1}, respectively, compared with the 477 g kg^{-1} average of the five check hybrids. Days from planting to flowering of hybrids with HA 429, HA 430, HA 431, HA 432, and HA 433 were 69, 71, 72, 72, and 71 d, respectively, compared with a 70 d average for the five check hybrids. Plant height of hybrids with HA 429, HA 430, HA 431, HA 432, and HA 433 was 165, 170, 193, 170, and 175 cm, respectively, compared with a 173 cm average for the five check hybrids. Hybrids with HA 429, HA 430, HA 431, HA 432, and HA 433 showed lodging resistance and the stay-green characteristic over the 3 yr of testing.

Limited quantities of seed of each germplasm are available from the Seedstocks Project, Department of Plant Sciences, Loftsgard Hall, North Dakota State University, Fargo, ND 58105. We ask that appropriate recognition be made if these germplasms contribute to the development of a new breeding line, germplasm, or hybrid. U.S. Plant Variety Protection will not be requested for HA 429, HA 430, HA 431, HA 432, or HA 433.

J.F. Miller* and G.J. Seiler

References

Miller, J.F., and T.J. Gulya. 1995. Registration of four maintainer (HA 382 to HA 385) and four restorer (RHA 386 to RHA 389) sunflower germplasm lines. Crop Sci. 35:286.

Miller, J.F., and T.J. Gulya. 1997. Registration of eight maintainer (HA 393, HA 394, and HA 402 to HA 407) and seven restorer (RHA 395 to RHA 401) sunflower germplasm lines. Crop Sci. 37: 1988.

Roath, W.W., J.F. Miller, and T.J. Gulya. 1986. Registration of sunflower parental lines HA 821 and HA 822. Crop Sci. 26:217.

Seiler, G.J. 1991. Registration of 13 downy mildew tolerant interspecific sunflower germplasm lines derived from wild annual species. Crop Sci. 31:1714–1716.

USDA-ARS, Northern Crop Science Lab., PO Box 5677, Fargo, ND 58105. Registration by CSSA. Accepted 31 March 2003. *Corresponding author (millerjf@fargo.ars.usda.gov).

Published in Crop Sci. 43:2313–2314 (2003).

Registration of SR96 and SR97 Smooth-Root Sugarbeet Germplasm with High Sucrose

Sugar beet (*Beta vulgaris* L.) germplasm SR96 (Reg. no. GP-224, PI 628272) and SR97 (Reg. no. GP225, PI 628273) were developed by the USDA-ARS, East Lansing, MI, and the Michigan Agricultural Experiment Station, in cooperation with the Beet Sugar Development Foundation, Denver, CO. SR96 and SR97 were released in December 2002. Both germplasm releases share common ancestry with previously released USDA-ARS smooth-root germplasm (Theurer, 1993; Saunders et al. 2000). SR96 and SR97 have good agronomic performance, specifically higher sucrose concentrations than previous smooth-root releases, and provide sources for development of low soil tare parental lines with economically acceptable sucrose concentrations. The smooth-root character is desirable because less soil adheres to the root surface at harvest, which results in lower soil tare weights, less tare dirt disposal costs, and reduced spread of pathogen infested soils (Theurer, 1993). In experimental hybrids between smooth-root pollinators and seed parents with more highly developed root sutures (grooves), smooth-root scores of the hybrids were intermediate to the parents (Saunders and McGrath, unpublished). SR96 and SR97 share common East Lansing germplasm resistance to blackroot (caused by *Aphanomyces cochlioides* Drechs.) and leafspot (cause by *Cercospora beticola* Sacc.).

SR96 is a diploid multigerm population segregating for hypocotyl color (16 red/20 seedlings tested = 80%), that has an average heterozygosity of 47.4% (standard deviation = 8.4%) as determined by analysis of 118 polymorphic molecular markers (amplified fragment length polymorphisms, Vos et al., 1995) on 20 randomly selected plants. SR96 is derived from an initial seed production that included SP85700 (PI 590776), 28M3 [L53 (PI 590841) × L19 (PI 590690)], and 8400051 (a high sucrose line provided by American Crystal Sugar Co. Moorhead, MN). Mother roots with sucrose concentrations that exceeded the commercial check cultivar as well as roots with well-expressed smooth root phenotypes were selected from this population. Five generations of intermating mother roots with higher sucrose percentages and smoother roots of 5, 3, 17, 6, and 17 roots, respectively, resulted in the high sucrose percentage, highly smooth root population 95HS6. 95HS6 was evaluated in agronomic trials at Saginaw, MI, and 15 roots with shallow root sutures, few root hairs, and freedom from sprangles were sibmated and tested as 96HS03. A second cycle of mass selection for smooth-root was performed from agronomic trials of 96HS03 at Saginaw, MI, and seed from these 15 sib-mated smooth-roots was increased in Oregon. SR96 has been tested as WC980437 per se in agronomic trials. Self-fertility has not been tested, but both L53 and L19 are self-fertile and this character may be segregating in SR96.

SR96 has 3 to 10% improved sucrose concentrations over previous smooth-root releases and retains the extreme smooth root phenotype of SR87 (PI 607899), SR93 (PI 598075), and SR95 (PI 603947). SR96 had at least 96% of the mean sucrose percentages of the average of three commercial hybrids in 3 yr of agronomic trials at Saginaw, MI (average sucrose for SR96 = 17.05% versus 17.64% for commercial hybrid checks). SR96 had an 8 to 10% increase in sucrose percentage relative to smooth root varieties SR87, SR93, and SR95 over 2 yr at the same location. SR96 showed excellent resistance in the 2001 Betaseed, Inc. (Shakopee, MN) *Aphanomyces* root rot nursery (overall rating of 2.77 compared to 3.27 for the resistant and 4.63 for the susceptible checks), and exhibited excellent Cercospora leaf spot resistance in the 2001 USDA-ARS Ft. Collins, CO, leaf spot nursery (overall rating of 3.33 compared with 4.20 for the resistant and 5.43 for the susceptible checks). SR96 was susceptible to Rhizoctonia root and crown rot (caused by *Rhizoctonia solani* Kühn) and rhizomania [caused by *Beet necrotic yellow vein virus* (BNYVV)] in the 2001 USDA-ARS Ft. Collins, CO, and Salinas, CA, disease nurseries, respectively.

SR97 is a diploid multigerm germplasm segregating for hypocotyl color (15 red/20 seedlings tested = 75%), with an average heterozygosity of 48.2% (standard deviation = 7.7%), determined on the basis of the analysis of 118 polymorphic molecular markers (amplified fragment length polymorphisms) on 20 randomly selected plants. SR97 was derived from a composite population selected for increased sucrose percentage after four generations of mother root selection for smooth-root. The composite population was developed from SP85700 × L19 and US35 (PI 590584) × L53 (PI 590841). Typically, less than 5% of the plants in each generation were selected, with 11 roots contributing to the last generation specifically selected for high sucrose, whose progeny were tested as 94HS25. 94HS25 roots were selected for smooth-root in the same number and manner as developmental populations for SR96, and seed was tested as 96HS25 per se in agronomic trials at Saginaw, MI. Seed from 94HS25 was also increased in Oregon, and in subsequent agronomic tests, SR97 was tested as WC960452. Self-fertility has not been tested, but both L53 and L19 are self-fertile and this character may be segregating in SR97.

SR97 had at least 96% of the mean sucrose percentage of the average of three commercial hybrids in 3 yr of agronomic trials at Saginaw, MI (average sucrose for SR97 = 16.99% versus 17.64% for commercial hybrid checks). SR97 had an 8 to 10% increase in sucrose concentration relative to similar smooth root varieties SR87, SR93, and SR95 over 2 yr at the same location. SR97 showed excellent resistance in the 2001 Betaseed, Inc. Aphanomyces summer root rot nursery (overall rating of 2.63 compared with 3.27 for the resistant and 4.63 for the susceptible checks), and exhibited good Cercospora leaf spot resistance in the 2001 USDA-ARS Ft. Collins, CO leaf spot nursery (overall rating of 4.30 compared to 4.20 for the resistant and 5.43 for the susceptible checks). SR97 was susceptible to Rhizoctonia root and crown rot and rhizomania, in the 2001 USDA-ARS Ft. Collins, CO, and Salinas, CA, disease nurseries, respectively. SR97 is not as smooth as SR96, on the basis of a visual comparison of root suture depth. Its smooth root score is equivalent to SR80 (PI 607898) and SR94 (PI 598076).

SR96 and SR97 are being released as germplasm for developing parental lines combining smooth-root and high sucrose. Seed will be available for reproduction by writing to Dr. J. Mitchell McGrath, USDA-ARS, 494 PSSB, Michigan State University, East Lansing, MI 48824-1325. Seed of SR96 and SR97 has been deposited into the National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new cultivars. It is requested that the author be notified if this germplasm contributes to the development of a breeding line or cultivar. U.S. Plant Variety Protection will not be requested for SR96 and SR97.

J.M. McGrath*

Acknowledgments

The author is indebted to Lee Panella and Linda Hanson (USDA-ARS, Ft. Collins, CO) and Jay Miller and Margaret Rekoske (Betaseed, Inc., Shakopee, MN) for assistance with disease indexing; to J. Claire Theurer (retired), Joseph W. Saunders (deceased), and John Halloin (USDA-ARS, East Lansing, MI) for valuable suggestions and assistance; and Robert Sims, Scott Shaw, and Tim Duckert for technical assistance. These germplasm lines are dedicated in memory of Joseph Saunders.

References

Saunders, J.W., J.M. McGrath, J.C. Theurer, and J.M. Halloin. 2000. Registration of 'SR87' sugarbeet germplasm with low soil tare and resistances to *Cercospora* and *Aphanomyces.* Crop Sci. 40:1833–1834.

Theurer, J.C. 1993. Pre-breeding to change sugarbeet root architecture. J. Sugar Beet Res. 30:221–239.

Vos, P., R. Hogers, M. Bleeker, M. Reijans, T. Vandelee, M. Hornes, A. Frijters, J. Pot, J. Peleman, M. Kuiper, and M. Zabeau. 1995. AFLP– a new technique for DNA-fingerprinting. Nucleic Acids Res. 23:4407–4414.

USDA-ARS, Sugarbeet and Bean Research Unit, 494 PSSB, Department of Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824-1325. Cooperative investigations by the USDA-ARS, the Michigan Agricultural Experiment Station, and the Beet Sugar Development Foundation. Registration by CSSA. Accepted 31 March 2003. *Corresponding author (mitchmcg@msu.edu).

Published in Crop Sci. 43:2314–2315 (2003).

Registration of Two Germplasms of Rye with Introgressions of the *Glu-D1* Locus from Chromosome 1D of Bread Wheat

Two rye (*Secale cereale* L.) germplasms were developed by cytogenetic chromosome engineering to introduce the *Glu-D1d* locus from chromosome 1D of bread wheat (*Triticum aestivum* L.)(UCRR1-2001, Reg. no. GP-3, PI 628642; UCRR2-2001, Reg. no. GP-4, PI 628643). Locus *Glu-D1d* encodes the high molecular weight (HMW) glutenin subunits 5+10 that are considered critical for good breadmaking quality in wheat (Payne, 1987). Both germplasms carry fragments of chromosome 1D with the *Glu-D1d* locus inserted into chromosome 1R, where they replace rye locus *Sec-2*. Locus *Sec-2* encodes high molecular weight secalins.

The original cytogenetic manipulations were performed in hexaploid triticale (×*Triticosecale* Wittmack) 'Rhino' where two translocations of *Glu-D1d* to 1R were produced by homeologous recombination in plants with chromosome constitution 20" + 1RS.1DL' + 1R' (Lukaszewski and Curtis, 1992). Recombination was induced by the removal of the *Ph1* locus by a substitution 5D(5B). Translocated chromosome 1R.1D$_{5+10}$-1 was transferred to diploid rye by backcrosses and electrophoretic screening (Lukaszewski et al., 2000). During the transfer, at least two crossover events must have taken place that reduced the length of the introgressed segment of 1D. UCRR1-2001, also known as H510, appears to carry a range of 1DL segments of various lengths. UCRR2-2001, also known as HMA510, was produced following a selection for high male transmission rate of the translocated 1R chromosome and appears to carry small (er) introgressions of 1D. Both germplasms are outcrossing populations of winter rye with no indications of inbreeding depression. The pedigree of UCRR1-2001 is Rhino 1R.1D$_{5+10}$-1/Snoopy//5*Dankowskie Zlote; the pedigree of UCRR2-2001 is Rhino 1R.1D$_{5+10}$-1/Snoopy//5*Dankowskie Zlote/3/3*Motto/4/2*Amilo.

In all preliminary tests, introduction of *Glu-D1* into rye improved the parameters of breadmaking quality. The SDS-sedimentation value increased by 33 to 44% and the baking scores in test bakes performed by means of wheat technology were improved by 188 to 257% relative to control population without *Glu-D1*. The results of bake tests performed by means of rye technology were not affected (Lukaszewski et al., 2000). Introduction of a segment of wheat chromosome 1D into diploid rye reduced 1000-kernel weight in UCRR1-2001 by 15% relative to its control population (Lukaszewski et al., 2000), which reduced yield. This reduction must have been associated with excessive fragment length as it was not detected in UCRR2-2001.

These ryes may be used in wheat–rye blends or as components of new triticale lines. Small quantities of seed for research and breeding purposes can be obtained from the first author.

A.J. LUKASZEWSKI* AND W. BRZEZINSKI

References

Lukaszewski, A.J., and C.A. Curtis. 1992. Transfer of the *Glu-D1* gene from chromosome 1D of breadwheat to chromosome 1R in hexaploid triticale. Plant Breed. 109:203–210.

Lukaszewski, A.J., W. Brzezinski, and E. Klockiewicz-Kaminska. 2000. Transfer of the *Glu-D1* locus encoding high molecular weight glutenin subunits from breadwheat to diploid rye. Euphytica 115:49–57.

Payne, P.I. 1987. Genetics of wheat storage proteins and the effect of allelic variation on breadmaking quality. Annu. Rev. Plant Physiol. 38:141–153.

A.J. Lukaszewski, Dep. of Botany and Plant Sciences, University of California, Riverside CA 92521-0124; W. Brzezinski, Research Center for Cultivar Testing, 63-022 Slupia Wielka, Poland. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (ajoel@ucrac1.ucr.edu).

Published in Crop Sci. 43:2315–2316 (2003).

Registration of Three Germplasms of Hexaploid Triticale with Introgressions of Wheat Storage Protein Loci from Chromosome 1D of Bread Wheat

Three triticale (×*Triticosecale* Wittmack) germplasms were developed by cytogenetic chromosome engineering to introduce storage protein loci *Glu-D1d, Gli-D1*, and *Glu-D3* from chromosome 1D of bread wheat (*Triticum aestivum* L.) to rye (*Secale cereale* L.) chromosome 1R (UCRTCL1-2001, Reg. no. GP-15, PI 628656; UCRTCL2-2001, Reg. no. GP-16, PI 628657, also known as Presto Valdy; and UCRTCL3-2001, Reg. no. GP-17, PI 628658, also known as Presto Valdy $5+10^{IV}$). Locus *Glu-D1d* encodes the high molecular weight glutenin subunits 5+10 that are considered essential for good breadmaking quality in wheat (Payne, 1987); it is located on the long arm of 1DL. Loci *Gli-D1* and *Glu-D3* encode gliadin and low molecular weight glutenin, respectively. They are located on 1DS and tightly linked (Payne, 1987).

The original cytogenetic manipulations were performed in hexaploid triticale cv. Rhino where a translocation of *Glu-D1d* to 1R was produced by homeologous recombination in plants with chromosome constitution 20” + 1RS.1DL’ + 1R’ (Lukaszewski and Curtis, 1992). Recombination was induced by the absence of the *Ph1* locus in a substitution 5D(5B). In the translocated chromosome 1R.$1D_{5+10}$-2, the long arm of which is present in all three germplasms, the segment of 1RL with rye locus *Sec-3* was replaced by a corresponding segment of 1DL with locus *Glu-D1d*. This chromosome, known as 1R.$1D_{5+10}$-2, was transferred to the triticale cultivar Presto (’Alamo’) by backcrosses and electrophoretic screening. The pedigree of UCRTCL1-2001 is Rhino1R.$1D_{5+10}$-2/9* Presto. Once in Presto, chromosome 1R.$1D_{5+10}$-2 was recombined with a wheat-rye translocation chromosome WR4 (T1DS.1RS.1DL) (Koebner and Shepherd, 1986). The 1RS arm in this translocation carries a short terminal wheat segment containing wheat storage protein loci *Gli-D1* and *Glu-D3*; the rye segment contains rye secalin locus *Sec-1*. The resulting triple translocated chromosome T1DS.1RS.1RL.1DL.1RL, named Valdy, carries all storage protein loci of chromosome 1D of bread wheat and *Sec-1* locus of rye. This chromosome is present in UCRTCL2-2001, Presto Valdy, with a pedigree: Rhino1R.$1D_{5+10}$-2/6* Presto//WR4/3/6*Presto.

The triple translocated rye chromosome Valdy (T1DS.1RS.1RL.1DL.1RL) was combined with a translocation of the *Glu-D1* locus to chromosome 1A of triticale, in a germplasm UCRTCL3-2001. Its pedigree is Rhino 1R.$1D_{5+10}$-2/5*Presto//WR4/3/4*Presto/4/Rhino1A.$1D_{5+10}$-4/3*Presto. Translocations of segments of 1D with the *Glu-D1* locus to chromosome 1A were produced in hexaploid triticale Rhino (Lukaszewski and Curtis, 1994). From a range of available translocations of *Glu-D1* with locus *d*, 1A.$1D_{5+10}$-4 (T1AS.1AL.1DL.1AL) was used. Combination of the two translocations produces a line of hexaploid triticale with four doses of the *Glu-D1* locus, standard two doses of *Gli-D1* and *Glu-D3*, and two doses of *Sec-1*.

In all preliminary tests, introduction of *Glu-D1, Gli-D1,* and/or *Glu-D3* into hexaploid triticale significantly improved all parameters of breadmaking quality. The rate of improvement was strongly dependent on the recipient with the highest relative increases observed in poor quality triticales (Lukaszewski, 1998). Small quantities of seed for research and breeding purposes can be obtained from the author.

A.J. LUKASZEWSKI*

References

Koebner, R.M.D., and K.W. Shepherd. 1986. Controlled introgression to wheat of genes from rye chromosome arm 1RS by induction of allosyndesis. Theor. Appl. Genet. 73:197–208.

Lukaszewski, A.J. 1998. Improvement of breadmaking quality of triticale through chromosome translocations. *In* P. Juskiw (ed.) Proc. Int. Triticale Symp. 4th, Red Deer, AB, Canada. 26–31 July 1998. Int. Triticale Assoc., Armidale, NSW, Australia.

Lukaszewski, A.J., and C.A. Curtis. 1992. Transfer of the *Glu-D1* gene from chromosome 1D of breadwheat to chromosome 1R in hexaploid triticale. Plant Breed. 109:203–210.

Lukaszewski, A.J., and C.A. Curtis. 1994. Transfer of the *Glu-D1* gene from chromosome 1D to chromosome 1A in triticale. Plant Breed. 112:177–182.

Payne, P.I. 1987. Genetics of wheat storage proteins and the effect of allelic variation on breadmaking quality. Annu. Rev. Plant Physiol. 38:141–153.

Dep. of Botany and Plant Sciences, University of California, Riverside CA 92521-0124. Registration by CSSA. Accepted 30 April 2003. *Corresponding author (ajoel@ucrac1.ucr.edu).

Published in Crop Sci. 43:2316 (2003).